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GENERAL MANAGEMENT ASSISTANCE CONTRACT (GMAC)

**Contract No: 674-C-00-01-00051-00**

**Green Power for the World Summit on Sustainable Development**

Grant No. 0046-0402-G-GA14

**Agama Energy (Pty) Ltd**

This report was produced for review by the USAID. It was prepared as a performance milestone under Mega-Tech, Inc.'s prime contract. The contents of this report address activities performed under USAID/South Africa's Strategic Objective No. 6: Increased Access to Shelter and Environmentally Sound Municipal Services

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### **Activity Summary and achievements:**

The overall goal of the grant program was to: a) development a regulatory and trading framework for the development of a green power market in South Africa (as a stimulus for investment in new renewable energy generation capacity as per the policy of the SA Department of Minerals and Energy); and b) test the effectiveness of the regulatory and trading regime with the practical example of supplying green power into the main venues of World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002.

The above objective was successfully achieved at the WSSD due to the fact that sufficient green electricity generation capacity was identified, a green electricity trading system and tariff was implemented with the full cooperation of the National Electricity Regulator (NER), and the commitment to purchase the green electricity was made by the venues and City Power, the local electricity utility. A further measure of the success has been the commitment of the NER, City Power, and other stakeholders to develop and implement the system on an ongoing basis, beyond the objectives of the project itself and as an integral part of the Southern African electricity supply industry. This is sure to stimulate the economy (including direct investment in rural economies) by providing a more secure basis for investment in renewable energy generation, stimulate employment and accelerate the empowerment of disadvantaged communities. The project is significant in that it has pioneered a completely new approach to the generation, sale, and purchase of electricity in South Africa, in the line with the government's new policies.

The attached Grant Activity Completion Report and Final Report present the program and its achievements in more detail.

### **Contents of this report:**

1. Grant Activity Completion Report (June 2003)
2. Final Report (November 2002)

## Grant Activity Completion Report

1. Name of Organisation	Agama Energy (PTY) Ltd.
2. Grant Activity	Green Power for the World Summit for Sustainable Development
3. Grant Period	April 2002-November 2002
4. Briefly describe the grant objectives achievements and impact as a result of the grant activities implemented during the grant period.	
<p>The primary objective of the project was to:</p> <ul style="list-style-type: none"> <li>a) develop a regulatory and trading framework for the development of a green power market in South Africa (as a stimulus for investment in new renewable energy generation capacity as per the DME's policy) and,</li> <li>b) test the effectiveness of this regulatory and trading regime with the practical example of supplying green power into the main venues of the WSSD.</li> </ul> <p>The above objective was successfully achieved at the WSSD due to the fact that sufficient green electricity generation capacity was identified, a green electricity trading system and tariff was implemented with the full cooperation of the National Electricity Regulator (NER) and the commitment to purchase the green electricity was made by the venues and City Power, the local electricity utility. A further measure of the success has been the commitment of the NER, City Power and other stakeholders, to develop and implement the system on an ongoing basis, beyond the objectives of the project itself and as an integral part of the Southern African electricity supply industry. This is sure to stimulate the economy (including direct investment in rural economies) by providing a more secure basis for investment in renewable energy generation, stimulate employment and accelerate the empowerment of disadvantaged communities. The project is significant in that it has pioneered a completely new approach to the generation , sale and purchase of electricity in South Africa, in line with the government's new policies.</p>	
4. Briefly discuss the implementation process, including lessons learned and recommendations	
<p>The two main venues for the WSSD used 845 MWh of green electricity, which was metered by metering equipment supplied by City Power, and which was read on a daily basis by project staff during the period of the summit. Problems encountered were:</p> <ul style="list-style-type: none"> <li>a.) Although the project team identified sufficient green electricity to provide 100% power to the main WSSD venues, Eskom's refusal to allow certain venues (Sandton Convention Centre and Sandton Hilton) to participate, resulted in only 27% of the WSSD's power consumption being supplied by green electricity. (This statistic was provided by the "Greening the Summit" project)</li> <li>b.) Although the project team had been advised by DEAT that the project would be showcased on the DEAT stand at the Ubuntu Village, there was no evidence of that at all. As a result, the project team had to improvise by drafting and printing last-minute posters and flyers and using a project team members' exhibition stand to promote the project.</li> <li>c.) The fact that the grant amount was fixed in US dollars means that, due to the Rand strengthening, the grant amount has decreased by up to 10%. This does not seem to have directly hampered this particular project but has provided some insecurity for project teams. ( please refer to the detailed final project report submitted to MTI)</li> </ul>	
5. Public Dissemination: GMAC requires that all grant activity deliverable(s) of the grant activity (e.g., a report or survey) must be made available to the general public. Briefly discuss how the grants activities and results were made accessible to interested parties.	
<p>The public awareness task of the project was encouraging due to the appearance of over fifty media articles, radio and television interviews and an extensive email information programme. The project team cooperated with the IUCN "Greening the Summit" team by collecting consumption data and integrating it into their daily "Green Barometer" display at WSSD venues. The organization has a web site where project information can be obtained. The also engaged relevant government departments. Significantly, the project engaged personally with the Minister of Minerals and Energy on two occasions to inform her of the status of the project. However more work needs to be done at a community and schools level to promote awareness of renewable energy.</p>	

Signature of Grantee



Date

03/06/2003

## GMAC Grant Funds Reconciliation

NGO Name:

Grant Activity Title:

Line Item Budget (GMAC only)	Quarter 1 (Jan-Mar)		Quarter 2 (Apr-Jun)		Quarter 3 (Jul-Sep)		Quarter 4 (Oct-Dec)		Total		Variance
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
<b>Administration &amp; Management</b>											
Salaries & Benefits			136,595	136,595	2,713	2,713			139,308		
Operating Costs											
Travel & Perdiem											
<b>Subtotal</b>			136,595	R 136,595	2,713	R 2,713			139,308	R 139,308	R 0
<b>Direct Activity</b>											
Salaries & Benefits			420,468	168,655	64,228	323,026	153,125	36,006			
Other Direct Costs			133,960	133,960			120,726	120,726			
Professional Fees											
Training											
Travel & Perdiem											
Goods & Material											
<b>Subtotal</b>			554,428	R 302,615	64,228	R 323,026	R 273,851	R 156,732	892,507	R 782,373	
<b>Total</b>			R 691,023	R 439,210	R 66,941	R 325,739	R 273,851	R 156,732	1,031,815	R 921,681	-R 110,134
<b>Counterpart Contribution</b>											
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
NGO			58,688	58,688	48,906	48,906	70,246	180,382	177,840	287,976	
Third Party											
Other			400,000	200,000	0		0	0	400,000	200,000	
<b>Total</b>			R 458,688	R 258,688	R 48,906		R 70,246		R 577,840	R 487,976	-R 89,864
									R 1,609,655	R 1,409,657	-R 199,998

**GREEN POWER**

**FOR THE**

**WORLD SUMMIT ON SUSTAINABLE  
DEVELOPMENT**

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**Final Report**

November 2002

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# Executive Summary

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## 1 Introduction

This report documents the Green Power for the WSSD<sup>1</sup> Project which was implemented between May and November 2002. The project was supported by a grant under the Department of Environmental Affairs and Tourism climate change programme, funded by the United States Agency for International Development (USAID).

The project was initiated and led by AGAMA Energy, based on the perception that:

- The negative environmental impacts of the WSSD could be lessened by the utilisation of new green electricity services
- The opportunity of supplying green electricity into the WSSD venues would catalyse a process of delivering increasing proportions of green energy into the South African energy economy over the longer term
- The establishment of a regulatory and trading regime for Green Electricity for the supply of Green Power to the main venues of the World Summit on Sustainable Development (WSSD) would accelerate the delivery of a more sustainable mix of energy services in South Africa over the longer term.

Finally, the project seemed appropriate and relevant given the fact that energy was one of the five main focus areas of the WSSD.

The project kicked off in late in April 2002 and delivered the key output of green electricity to two key WSSD venues within the context of a NER-approved and administered regulatory and trading framework for Green Power in August/September 2002. The project was concluded by mid-November 2002.

## 2 Statement of grant objective

The replicable service provision of green electricity to the World Summit for Sustainable Development (WSSD) in the City of Johannesburg, South Africa in August and September 2002

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<sup>1</sup> The United Nations World Summit on Sustainable Development (WSSD) was held in Johannesburg, South Africa between 26<sup>th</sup> August and 4<sup>th</sup> September 2002. Refer to <http://www.johannesburgsummit.org/> for more details.

### 3 Statement of verifiable results

The following were the statements of verifiable results for the project:

**Metered green electricity being used in all the WSSD venues and activities for the duration of the WSSD**

Together, the two of the main venues for the WSSD, namely the Ubuntu Village and the NASREC Expo Centre, used 845 MWh of green electricity for the duration of the WSSD activities at these venues. This electricity was metered by metering equipment supplied by City Power and which were read on a daily basis by project staff.

**A quantified reduction of greenhouse gases, especially CO<sub>2</sub> emissions as a result of the use of green electricity for the WSSD**

The reduction in emissions of greenhouse gases is attributable to energy conservation in the operation of the venues and the displacement of coal- and nuclear-based electricity generation by green electricity derived from new green generation plant. 58 MWh of the total of 845 MWh of green electricity was new green electricity. The associated resource savings and emissions reductions achieved by the project are summarised below:

	Electricity Consumed MWh	Avoided consumption		Avoided emissions				
		Coal tons	Water kilolitres	CO <sub>2</sub> tons	Ash (dumped) tons	Ash (airborne) tons	SO <sub>2</sub> tons	NO <sub>x</sub> tons
		Overall consumption of Green Electricity at WSSD	844.84	414	1022	651	110	0.296
Electricity derived from new green generation	58	28	70	45	8	0.020	0.5	0.2
Electricity derived from existing green generation	786.84	386	952	606	102	0.275	6.3	2.8

Although relatively small, these impacts are significant in that they have established a mechanism for scaling up the small, but real, contribution achieved here.

**A precedent established for a new market for green electricity which in turn will stimulate investment and job creation in new renewable energy power producers.**

The project clearly established the precedent for a green power market in the South (and southern) African region. This latent, but emerging, market will create long-term employment in both the generation and the distribution sectors of the electricity industry.

**Formal power wheeling agreements in place between existing green power producers and Eskom's transmission division for the supply of green electricity into the national grid for the duration of the WSSD and thereafter.**

The necessity for wheeling agreements was made redundant by the development of a certificate-based trading mechanism for valuing and trading the 'green' attributes of electricity generated in a sustainable manner from renewable energy resources<sup>2</sup>. The access to the transmission and distribution networks was ensured by the National Electricity Regulator and by City Power. The principles of open access are established and confirmed.

**Formal agreements between a green electricity service provider and JOWSCO (WSSD organising company) and WSSD venues providing for the purchase of green electricity.**

All four venues selected for the project agreed to participate by purchasing green electricity for the duration of the WSSD. Three of these venues – the Sandton Convention Centre, Sandton Hilton Hotel and NASREC Expo Centre - signed written letters of commitment and the fourth, Ubuntu Village, provided a verbal agreement. During the course of the project Eskom declined to participate and consequently only the green electricity supply agreements for Ubuntu Village and NASREC Expo Centre were implemented.

**National Electricity Regulator's approval or licensing of a green electricity service provider.**

The Board of the National Electricity Regulator formally endorsed the project and the NER approved City Power's application for a green tariff to supply green electricity to the two participating WSSD venues. City Power was already a licensed distributor for these venues.

**National Electricity Regulator's approval of green electricity tariffs.**

The NER approved a green electricity tariff for City Power. This tariff was based on the discussion document prepared by the project team.<sup>3</sup>

**Increased public awareness of green electricity**

The project stimulated significant public awareness of green electricity. The project generated a range of media and elicited response from a wide range of stakeholders in South (and southern) Africa including the electricity supply industry, major consumers, the government, the general public and the delegates to the WSSD itself. A full account of the media impacts is presented in the main report under Section 3.10.

**Public access to data and information about green energy being used at the WSSD and elsewhere.**

The project published data and information in briefing documents, press releases, radio and television interviews and on the web pages of the project and the Greening the Summit Project<sup>4</sup>.

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<sup>2</sup> Dingley C (2002), A Draft Regulatory and Trading Framework for a Green Electricity Market in South Africa, prepared for and in association with AGAMA Energy for the Green Power for the WSSD Project.

**Effective liaison and communication between the project team and other stakeholders, including but not limited to the Department for Minerals and Energy, the Department of the Environment and Tourism and the Department of Trade and Industry.**

The project was judged to have been partially successful in engaging with the relevant government departments. Written briefings were forwarded to these key stakeholders and personal telephone calls were made to inform these players of the status of the project. In practice there was generally a very low level of participation by these parties. Significantly, the project engaged personally with the Minister of Minerals and Energy on two occasions to inform her of the status of the project.

## **4 Methodology for measuring results**

The following methodologies were adopted for measuring the results:

**Metered electricity consumption by WSSD venues and activities.**

The electricity consumption at the participating venues was metered using the meters installed by City Power (in the case of the two venues supplied with Green Electricity) and Eskom (in the case of the Sandton Convention Centre and Sandton Hilton Hotel).

**Confirmation of metered green electricity production by green electricity plants**

The participating green electricity generators were approved by the National Electricity Regulator on the basis of their capacity to meter the green electricity production of each facility. The specific details of the metering equipment of each respective generator is documented on the NER's letters of approval to the qualifying green generators.

**Comparison of supply of green electricity and demand by WSSD venues and activities**

The overall electricity consumption of all four main venues was monitored and analysed to reflect the proportion of electricity which was supplied as Green Power and also in terms of the environmental impacts of the overall consumption of electricity and the consumption of Green Electricity. This comparison was presented during the WSSD on the web-site and media produced by the Greening the Summit Project based on data collected by this project<sup>5</sup>.

**Proof of payment and customer satisfaction determined by accounting records, interviews and a survey**

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<sup>3</sup> Refer to the discussion document 'A Draft Regulatory and Trading Framework for a Green Electricity Market in South Africa' available on [www.agama.co.za](http://www.agama.co.za) and [www.ner.org.za](http://www.ner.org.za).

<sup>4</sup> The Greening the Summit Project was a parallel and complementary project to the Green Power for the WSSD Project. It was funded and supported by the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs (DACEL), the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the World Conservation Union (IUCN).

<sup>5</sup> Refer to [www.greeningthewssd.com](http://www.greeningthewssd.com)

This aspect of the project was scaled down due to the fact that the project budget was reduced. As the funding was confirmed in US Dollars, the fact that the Rand strengthened approximately 16% over the 7 month period of the project resulted in the Rand value of the project funding reducing proportionately. Megatech Inc, on behalf of USAID, advised that due to the reduction of total funds available it may be necessary to curtail project activities or seek other funding. Stakeholders were contacted to ensure that they were satisfied with the results of their participation but no formal survey was held.

#### **Quantify the reduction of greenhouse gas emissions**

The greenhouse gas emissions were quantified on the basis of the emissions associated with the avoided consumption of electricity generated by the average generation mix of the bulk supplier to City Power, namely Eskom. These emissions were calculated using the published emissions data in Eskom's Environmental Report, quoting data for 2000.

## **5 Definition of successful grant objective achievement**

#### **Certified reductions in greenhouse gas emissions for the duration of the WSSD when compared with a "business as usual" baseline.**

The project delivered quantified reductions in greenhouse gas emissions from new green generation systems. The four sources of this new green electricity were the grid connected solar PV system at Earthlife's Greenhouse project in Joubert Park, Johannesburg, the 500 off-grid solar PV systems installed by NUON-RAPS in rural villages in Maputaland, the Tierras Morenos wind farm in Costa Rica (operated by Energia Global International, Ltd. which is a subsidiary of Enel GreenPower, S.p.A.) and geothermal electricity from Enel Greenpower, S.p.A. in Italy. It must be noted that the primary object of the project was to identify, highlight and utilise sources of green electricity, regardless of whether they were existing or new. Clearly, any new capacity was encouraged to offset the resource consumption and emissions associated with 'conventional' electricity.

#### **Certification by National Electricity Regulator that the WSSD operated wholly on green electricity purchased by JOWSCO and the WSSD venues.**

The certification of the use of green electricity by the WSSD venues is implicit in the approval of the generators as green, the approval of City Power to supply green electricity against a green tariff, and the metered consumption of this electricity.

#### **Awareness by summit delegates and members of the public worldwide, of green electricity and the use thereof in WSSD**

The usage of green electricity at the WSSD was communicated to summit delegates through the display on the AGAMA Energy stand at the Ubuntu Village, several thousand printed flyers, the displays on the Greening the Summit Green Barometer screens

installed at most WSSD venues, a full page advertisement in the S A Development Handbook distributed to some delegates and articles in the official daily WSSD publications. Details of the awareness-raising programme for the public are presented in the main report under Section 3.10.

**A formal undertaking by the management of the WSSD venues, that they will continue to purchase green electricity after the WSSD is over.**

The project was not able to establish formal undertakings by the venue managers to continue to purchase green electricity. In retrospect, this definition of a successful grant achievement was perhaps unrealistic – especially given the short project duration and the reducing project budget.

**Expressions of interest in construction and licensing of new, green electricity producers.**

Expressions of interest have been received on at least three projects involving the construction of new generation capacity. More details are presented in the main report in Section 3.7.

**Establishment of an initial basis for green electricity pricing.**

The project team submitted a structure for the basis for green electricity pricing, to the National Electricity Regulator. City Power applied to the NER to set a green electricity tariff based on this tariff structure which was approved by the NER<sup>6</sup>.

## 6 Conclusions

Based on the experience of the project the following conclusions are relevant:

- The Green Power for the WSSD Project succeeded in opening up the beginnings of a new era of differentiated electricity service offerings by delivering 845 MWh of green electricity to two of the main venues of the WSSD within the context of a regulatory and trading framework for green electricity (or green power) which was adopted and implemented by the National Electricity Regulator.
- There is substantial interest among all stakeholders in a green power market in the southern African region.
- The project has provided a stimulus to the development of government's White Paper on Renewable Energy which is currently under submission to the Cabinet.
- This project is significant in that it has pioneered a completely new approach to the generation, sale and purchase of electricity in South Africa. Although it constitutes a departure from the current system, it is directly in line with the government's new policies. This is apparent from the Department for Minerals

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<sup>6</sup> Refer to Annexure B - Development of a green electricity tariff for venues hosting the World Summit on Sustainable Development

and Energy's call for proposals for the restructuring of the Electricity Supply Industry (ESI), on 15<sup>th</sup> June 2002.

- The major challenge was the need to design a new system, obtain the consent and support of the authorities and implement the system in the space of four to five months. Due to the time constraints, the final dates for achievement of monthly deliverables had to be extended by a few weeks in some cases. These extensions were unavoidable due mainly to the reliance on responses from other parties such as Eskom, NER, venue management and green electricity generators.
- The project team met with some uncertainty but also with a great deal of enthusiasm from different sectors of the ESI. The main challenge and constraint was the short space of time. However, the grant objectives were met and the project is already proving to be a catalyst for fast tracking change towards renewables in the ESI.
- The project has elicited significant interest and comment.
- The overall objective of the project was to develop a regulatory and trading framework for the development of a green power market in South Africa (as a stimulus for investment in new renewable energy generation capacity as per the DME's policy) and, furthermore, to test the effectiveness of this regulatory and trading regime with the practical example of supplying green power into the main venues of the WSSD.
- This report indicates that, not only were the grant objectives were achieved, but many targets were exceeded.
- The adage 'what gets measured, gets managed' may hold true then determining the green electricity indicators for the WSSD. The information from the measurements will set a precedent for subsequent Summits. No Summit has ever provided green electricity for the proceedings nor measured the contribution towards electricity consumption and various associated environmental impacts. The Green Power Project along with the Greening of the Summit Project together contributed towards establishing a base of information from which future United Nations international forums can be benchmarked.
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## ACKNOWLEDGEMENTS

The author(s) and AGAMA Energy would like to acknowledge the contribution of the many people who have supported and participated in this project and who reviewed and commented on the various versions of this document and/or annexures hereto.

Our specific thanks are due to the project team comprising :

- Charles Dingley of Green Light Solutions
- Catherine Fedorsky of GEOcc
- Davin Chown, Belynda Hoffman and Sven Kreher of One World Sustainable Investments
- Louis de Lange of Genesis Eco-Energy
- Gail Jennings of Galeforce Communication
- Jorgen Boldt of Rambøll
- Chris Purcell of EDG
- Pluto Panoussis of Dill Pickle Products
- David and Tammi Oldfield

In addition, the support and participation of the following people ensured the success of the project and made it fun:

- Wolsey Barnard, National Electricity Regulator
- Yousuf Haffejee, City Power
- Hannes Venter, NASREC Expo-Centre
- Richard Flack-Davison, Sandton Convention Centre
- Mark Hammond, Hilton Hotel, Sandton
- Jeremy Burnham, JOWSCO and Peoples' Earth Summit
- The Greening the WSSD project team
- Mike Swan, Tongaat-Hulett
- Denis Tomlinson, ILLOVO
- Mike Munnik, BP
- Douglas Banks, Nuon-RAPS
- Julie Smith-Galvin, Energia Global International, Ltd

- Martino Pasti, Enel Greenpower

The names of the people who provided input on various other documents, attached hereto as annexures, are referred to in the preambles to each specific document.

Lastly, the project would not have occurred without the financial support provided by USAID and administered by the staff of MegaTech Inc. in Pretoria.

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## NOMENCLATURE, ABBREVIATIONS AND CONVERSIONS

### Terminology

Green electricity - the general term for electricity that has been produced in a sustainable manner. It can be produced by various renewable energy sources like wind, solar, and hydropower.

Hydropower – The energy of flowing water, which can be harnessed to make electricity or do mechanical work.

Photovoltaic – A technology for using semiconductors to directly convert light into electricity.

Renewable Energy – Sources of energy that are either continuously resupplied by the sun or tap inexhaustible resources, e.g. wind, solar, biomass, hydropower or geothermal.

Solar Heating – Various technologies for using the sun's energy to heat water and living spaces.

Solar Thermal Electric – A technology for generating electricity from the sun's heat.

Wind Power Plant – A group of wind turbines connected to a common electricity grid.

### General abbreviations

DEAT	Department of Environment and Tourism
DME	Department of Minerals and Energy
NER	National Electricity Regulator

### Abbreviations

DB	distribution board
LPG	liquefied petroleum gas
PF	power factor
LV	low-voltage

### Units used

MWh	megawatt hour
kWh	kilowatt hour - a unit of electrical energy, equal to 1000 watts of power delivered for a period of one hour.
WSSD	World Summit on Sustainable Development
MJ	mega Joule
kVA	kilovolt-ampere
kV	kilovolt
kW	kilowatt

kl kilo litre

kg kilogram

W Watt – Watts are used to measure the total quantity of electricity.

1 watt is the power developed by an electric current of 1 ampere across a potential of 1 volt.

1 kilowatt (kW) = 1000 watts

1 megawatt (MW) = 1000 kilowatts = 1 million watts

1 gigawatt (GW) = 1000 megawatts = 1 billion watts

### Conversion factors

CO<sub>2</sub> emissions per MWh electricity consumed

770 g CO<sub>2</sub> / kWh = 770 kg CO<sub>2</sub> / MWh electricity consumed

Source: GHG Protocol

CO<sub>2</sub> emission per kg LPG burned

1.52 kg CO<sub>2</sub> / litres fuel used

Source: GHG Protocol

kl water consumed per MWh electricity generated

1.21 litre water used / kWh = 1.21 kilolitre water used / MWh

Source: Eskom environmental report, 2000 figures

Coal / oil burned per MWh electricity generated

0.49 kg coal used / kWh = 490 kg coal used / MWh

Source: Eskom environmental report, 2000 figures

Waste / effluent produced per MWh electricity generated

Data unknown

CO<sub>2</sub> emitted per tonne/ kg waste to landfill

Municipal Solid Waste = MSW

0.077 Gg CH<sub>4</sub> / Gg MSW = 0.077 kg CH<sub>4</sub> / kg MSW

Methane (CH<sub>4</sub>) global warming potential:= 21

Thus: 0.077 kg CH<sub>4</sub> / kg MSW => 1.617 kg CO<sub>2</sub> / kg MSW

Source: Greater Johannesburg Metropolitan Council scoping investigation into energy efficiency and GHG mitigation

CO<sub>2</sub> emitted per tonne paper recycled?

Data unknown

Water consumed per tonne paper recycled.

Data unknown

Other:

130 grams ash produced / kWh electricity used

0.35 grams ash emitted / kWh electricity used

7.95 grams SO<sub>2</sub> emissions / kWh electricity used

3.56 grams NO<sub>x</sub> emissions / kWh electricity used

Source: Eskom environmental report, 2000 figures

# Project report

## 1 Introduction

This report documents the methodology and key findings of the Green Power for the World Summit on Sustainable Development (WSSD) Project.

### 1.1 Background

The project was originated by AGAMA Energy with the idea that the WSSD should utilise Green Power and thereby mitigate the greenhouse gas emissions associated with fossil fuel-fired electricity generation.

Furthermore, the project concept was considered appropriate given the conducive environment in South Africa for fast-tracking green electricity services to the main WSSD venues.

The anticipated benefits were thought to be:

- Provision of a high quality and more sustainable service to the WSSD venues, and
- Demonstration of the potential for a more sustainable mix of supply options within the Electricity Supply Industry (ESI) in Southern Africa.
- Unlocking of a new market paradigm for differentiated electricity services which in turn could accelerate the investment in new green generation capacity.

## 2 Project Organisation

The project was implemented by a multi-disciplinary team which was led by AGAMA Energy. The team comprised:

Organisation	Project role	Staff
AGAMA Energy	Project leader Project management	Glynn Morris Mark Harris Rendani Kharivhe Lucy Woodhouse
Greenlight Solutions	Regulatory and trading mechanisms; green tariffs	Charles Dingley
GEO	Monitoring and environmental evaluation	Catherine Fedorsky
Rambøll	Sourcing green electricity and technical aspects of research	Jorgen Boldt Christina Pedersen

	aspects of research	
OneWorld Sustainable Investments	Investment and CDM aspects	Davin Chown Belynda Hoffman
Energy & Development Group	Energy Surveys	Chris Purcell
Galeforce Communication	Media and Communication	Gail Jennings Sam Solomons
Dill Pickle Products	Design and printing	Pluto Panoussis
Cave Creations	Logistical support	David Oldfield Tammi de Kock

The project operated from the AGAMA Energy offices in Tokai, Western Cape.

### 3 Grant activity implementation tasks

The project activities were defined in the project document and are described under the same headings below.

#### 3.1 Task 1 - Project Administration

##### 3.1.1 Project management and liaison with the client

The project team held regular project meetings on a weekly basis for the duration of the project until the commencement of the WSSD activities at the Ubuntu Village Exhibition on 14<sup>th</sup> August 2002. All meetings were minuted.

The project administration with the client was handled via MegaTech Inc. in Pretoria. Variations to the original grant agreement, such as deliverables and deadlines for some milestone deliverables were amended in terms of formal signed amendments to the grant agreement.

##### 3.1.2 Coordination with the Greening the WSSD Project

The project team, represented by Glynn Morris and Gail Jennings, attended several meetings with the Claudia Holgate, project co-ordinator for the IUCN Greening the Summit Project, and that project team to ensure that the Green Power for the WSSD Project complemented and dovetailed with the IUCN project. Glynn Morris and Gail Jennings attended several technical co-ordination meetings at JOWSCO offices.

Weekly reports on a prescribed reporting matrix were circulated between the project team and the Greening the Summit team.

##### 3.1.3 Project accounting

As agreed in the grant agreement, records of all expenses and payments for the project were kept. All project funds were administered in a separate project account (AGAMA Energy's Standard Bank Marketlink account).

### 3.1.4 Project implications of exchange rate variations

The scope and extent of the project was profoundly affected by variations in the Rand/US Dollar Exchange rate. As the funding was confirmed in US Dollars, the fact that the Rand strengthened approximately 16% over the 7 month period of the project has resulted in the Rand value of the project funding reducing proportionately. MegaTech Inc. advised that due to the reduction of total funds available it may be necessary to curtail project activities or seek other funding. Given the difficulties of raising top-up funding mid-stream and at a time when WSSD budget allocations were already fully committed, the following re-allocations of the project budget and revisions to the deliverables in the grant agreement were negotiated to compensate for the effective reduction in the overall budget:

- Webcams were excluded by co-ordinating with the consumption barometer of the Greening the WSSD Project on which the daily consumption readings of the Green Power for the WSSD Project were displayed
- A proportion of the project funds were reallocated to the travel budget, particularly air fares. This was necessary to enable the presence of various key project team members in Johannesburg before and during the WSSD. This has resulted in higher transport expenses than budgeted for due to the fact that most project team members are Cape Town-based.
- The time-consuming activity of soliciting patrons was curtailed.
- Budgeted hours/days for certain activities were curtailed and the extra time worked may be considered as time donated by the project team.
- Rambøll spent fewer days than allocated in the budget. AGAMA Energy undertook most of the tasks originally allocated to Rambøll and the fees were accordingly reallocated to AGAMA Energy. AGAMA Energy also undertook some tasks originally allocated to other project team members and the allocation of days was adjusted accordingly.

A breakdown of the project accounts, based on a total of R921681 payable to the project team, are attached in Annexure CC.

## 3.2 Task 2 - Determine the energy service needs of WSSD venues

Immediately after the project inception, Glynn Morris had several meetings with the respective managements of the WSSD venues to introduce the project, obtain letters of commitment and set up energy surveys.

### 3.2.1 Letters of commitment from main venues.

**Sandton Convention Centre** (the main UN venue) – The management provided a signed letter of commitment. (a copy is attached in Annexure A). However, despite the undertaking in the letter of commitment, the management of the SSC withdrew from participation in the project on the advice of their supplier, Eskom. Consequently, the Sandton Convention Centre (and the Sandton Hilton) were invited to participate in the project independently of Eskom – for the electricity monitoring and perhaps by

purchasing green electricity certificates directly. In the event they assisted by providing daily consumption figures to the project team.

**Expo Centre** (formerly NASREC) – The management of the NASREC Expo Centre enthusiastically engaged with the project and provided a letter of commitment (attached in Annexure B).

**Sandton Hilton Hotel** – The newly-appointed services manager supported the project and undertook to sign a letter of commitment. However, as in the case of the SSC, Eskom declined to participate or collaborate with the project and consequently, neither the Sandton Hilton Hotel nor the Sandton Convention Centre were able to participate fully in the project. Despite the inability to participate in the supply of green electricity, the services manager assisted the project team with the energy survey and provided access to metering facilities during the WSSD.

**Ubuntu Village** – Both Glynn Morris and Mark Harris met with Jameson Hlongwane, the JOWSCO manager responsible for this venue, who confirmed JOWSCO was committed to purchasing green electricity for the Ubuntu Villlage. Citypower confirmed their involvement and commitment and Hlongwane undertook to provide a letter of commitment. Unfortunately, the letter was never produced - probably due to the extraordinary pressing and competing priorities for JOWSCO.

### 3.2.2 Energy surveys for the main WSSD venues

Chris Purcell of Energy & Development Group undertook comprehensive energy surveys of the Sandton Convention Centre, NASREC Expo Centre and the Sandton Hilton Hotel. Energy survey reports were produced and these were circulated to the venue managers for comments and corrections. These reports have been formatted and converted into .pdf files for reference and distribution at the discretion of the venue managers. The reports are presented in Annexure C, Annexure D and Annexure E.

### 3.2.3 Summary of energy survey findings

The essential findings of the energy surveys are summarised in the table below:

	<b>Sandton Convention Centre</b>	<b>Sandton Hilton Hotel</b>	<b>Nasrec Expo Centre</b>	<b>Ubuntu Village</b>
Type of venue	Exhibition / conference facility: on 27000 m <sup>2</sup> floor area add. 5000 m <sup>2</sup> covered parking	5 star hotel of 327 rooms, with conference and boardrooms: on 12000 m <sup>2</sup> floor area add. 8000 m <sup>2</sup> covered parking	Exhibition / conference halls on 47000 m <sup>2</sup> covered area	Temporary exhibition venue
<b>Energy services needs</b>	Exhibition hall lighting, power points	Lighting throughout building	Exhibition hall lighting, power points	Indoor lighting Outdoor lighting

	<p>points</p> <p>Office lighting, power points</p> <p>Aircon for offices, exhibition halls</p> <p>Ventilation fans only in basement parking</p> <p>Lifts, escalator and emergency services</p> <p>Cooking facilities for 2 x restaurants</p> <p>Refrigeration facilities for 2 x restaurants</p>	<p>building</p> <p>Airconditioning throughout building</p> <p>Space heating for guest rooms, public spaces</p> <p>General power supply for offices, conference centres boardrooms, guest rooms</p> <p>Hot water for guest consumption, pressure equalised</p> <p>Cooking facilities for full hotel kitchen</p> <p>Refrigeration and walk-in fridges (kitchen and bars)</p> <p>Sauna and gym</p> <p>Lift, escalators, fire protection and emergency services</p> <p>Ventilation fans only in basement parking</p>	<p>points</p> <p>Offices lighting, power points</p> <p>Aircon for offices only (no exhibition hall aircon)</p> <p>Mast lighting</p> <p>Cooking facilities for 2 x caterers (outsourced)</p> <p>Refrigeration facilities for 2 x caterers (outsourced)</p>	<p>Exhibition stands</p> <p>Catering</p> <p>Refrigeration</p> <p>Air conditioning</p> <p>Offices and administrative systems</p>
<b>Energy sources</b>	Electricity	Electricity LP Gas for some cooking	Electricity	Electricity LPG
<b>Resource consumption (normalised for summit occupancy)</b>	30 day period	20 day period	39 day period	27 day period
Electricity	900 MWh	622 MWh	1170 MWh	No historical data
LP Gas	N/A	2083 kg	N/A	Ditto
H <sub>2</sub> O consumed	3000 kl	4176 kl	20000 kl	Ditto
<b>Effects</b>				
Coal consumed	441 tons	304 tons	573 tons	No historical data
H <sub>2</sub> O for electricity	1089 kl	752 kl	1415 kl	ditto
Total H <sub>2</sub> O	4089 kl	4928 kl	21415 kl	ditto

Emissions/waste				
CO <sub>2</sub> emissions	693 tons	482 tons	900 tons	No historical data
Ash produced	117 tons	80 tons	152 tons	ditto
Ash emitted	315 kg	168 kg	409 kg	ditto
SO <sub>2</sub> emissions	7155 kg	4758 kg	9301 kg	ditto
NO <sub>x</sub> emissions	3204 kg	2214 kg	4165 kg	ditto

#### Notes

1. Figures based on energy audits of venues undertaken in May 2002 by Chris Purcell, Energy & Development Group on behalf of AGAMA Energy (Pty) Ltd for the Green Power for the WSSD Project.
2. Full reports of the energy surveys can be requested directly from the venues themselves.

### 3.2.4 Projected maximum demand and electricity consumption

In the case of the Ubuntu Village, which was still under construction, the maximum demand was determined as 2MVA and the electricity consumption is estimated to be less than 0.7 GWh over the three week period of the WSSD.

The maximum energy requirements for the venues was determined to be less than 30 MVA – probably as low as 10 – 12 MVA - with estimated consumption to be not more than 10GWh of electricity – probably in the region of 3.5 – 5 GWh in total.

## 3.3 Task 3 - Source green electricity generation capacity

### 3.3.1 Endorsement by the National Electricity Regulator

The Board of the (NER) endorsed the project and its aims at the board meeting on 28<sup>th</sup> June and offered their support in completing the project successfully. The NER Board specifically mandated Dr Wolsey Barnard to participate in the project and implement a registry and trading mechanism for tradable renewable energy certificates.

### 3.3.2 Inventory of green capacity

The project team undertook a quick investigation to identify all known potential sources of green power in the southern African region. Catherine Fedorsky of GEO cc liaised with Bill Balet at the Southern African Power Pool to confirm the capacity available during the Summit. Rambøll, AGAMA Energy and Green Light Solutions liaised with Eskom regarding their inventory of small hydro capacity, and IPPs in South Africa, Lesotho and Swaziland. The findings of this investigation were compiled into an inventory of green electricity generation capacity (refer to Annexure F).

### 3.3.3 Sourcing green electricity capacity for the WSSD

The project solicited interest from all potential green power generators. The following advertisement was placed in ESI Africa, one of the main African trade journals.

In addition to local (regional) sources, the project team had discussions with offshore green electricity producers (including Australia, Costa Rica and Italy) involving the sale of green electricity to the venues, based on tradable green electricity certificates. Glynn Morris communicated with ENEL, the Italian power utility who confirmed that there was

geothermal power available in Italy and also 24 MW available from Tierras Morenos wind farm in Costa Rica.

**CALLS FOR THE SUPPLY OF GREEN ELECTRICITY INTO A PILOT GREEN POWER MARKET**

**GREEN POWER FOR THE WSSD**

green energy solutions for Africa

**AGAMA**  
energy

contact GLYNN MORRIS  
(021) 701-7052 • glynn@agama.co.za • www.agama.co.za

AGAMA Energy is soliciting the supply of Green Electricity to the four main venues of the **World Summit for Sustainable Development** for the duration of its activities. This is a DEAT project which is funded by USAID. Suppliers of Green Electricity - at any scale - in the SADC region or internationally, are invited to contact us.

**Criteria for selection include:**

- Renewable Energy Sources
- Sustainable Green Technology / Processes



**Figure 1:** Advertisement for Green Power generation capacity published in ESI Africa

### 3.3.4 Facilitation of new green generation capacity

The project facilitated the installation of new green generation capacity. Glynn Morris facilitated the implementation of a new 2.1 kW<sub>p</sub> grid-connected PV system at the Greenhouse Project in Joubert Park, Johannesburg. The system was installed on a temporary basis by Solar-Fabrik, SA.



**Figure 2:** New 2.1 kW<sub>p</sub> grid-connected PV system installed at the Green House Project in Joubert Park, Johannesburg

In addition, the project facilitated the design, supply and installation of a small, 110 W<sub>p</sub>, grid-connected PV system in Noordhoek, Western Cape.

### **3.3.5 Certification criteria for registration of green power producers**

The project drafted a discussion document entitled 'The Criteria for Certification of Green Power Producers' for use as a basis for determining the eligibility of generation plant to supply green power into the project. This document is presented in **Error! Reference source not found.**

This document was adopted by the NER on 28<sup>th</sup> June 2002.

### **3.3.6 Registration of green power producers**

Green electricity producers were invited to register with the NER - on temporary basis for the duration of the project - as a green power generator. An example of a temporary registration as a green power generator is presented in Annexure H.

Tongaat-Hulett quantified the capacity available during the Summit from their four sugar mills. Other suppliers such as Friedenheim Hydro in Mpumalanga, Ceres Hydro, were approached, briefed and requested to assess their output capacity.

Eight institutions, representing a total of seventeen generators, registered with the NER. The combined total installed capacity of these seventeen registered green power generators was 126.3 MW of which 79.3 MW was southern African generation capacity and 152.85 kW was new green generation capacity.

The list of registered green generators is summarised overleaf.

### **3.3.7 Signed supply agreements with green generators**

The approval by the NER of registration as green electricity suppliers effectively established the supply agreements with the green generators.

Facility Name	Owner	Location	Power Source	Auxiliary Power Source	Electricity Conversion System	Generation Capacity in KVA	Proportion from Average Capacity	Average Capacity Factor	Ave Monthly MWh	Local Supply Authority	Facility Commission Date
Friedenheim Hydro Power Scheme	Friedenheim Irrigation Board	Nelspruit, Mpumalaga	Water	N/A	Water turbines	2500	100	95	1042	Enermax	01/02/88
Amatjuku Mill	Tongaat-Hulett Sugar Ltd	Felixon	Bagasse	Coal	Steam turbine/Turbo alternator	12500	99	90	4536	Enermax type E3 M1-15351-4	Unknown
Darnall Mill	Tongaat-Hulett Sugar Ltd	Darnall	Bagasse	Coal	Steam turbine/Turbo Alternator	7500	98	90	3888	GEC E42F-DM & E42-PM	Unknown
Entumeni Mill	Tongaat-Hulett Sugar Ltd	Entumeni	Bagasse	Coal	Steam turbine/Turbo Alternator	4400	90	90	2260	GEC E42F3C	Unknown
Maidstone Mill	Tongaat-Hulett Sugar Ltd	Tongaat	Bagasse	Coal	Steam turbine/Turbo alternator	26250	88	90	13608	Siemens DFS	Unknown
Felixon Mill	Tongaat-Hulett Sugar Ltd	Felixon	Bagasse	Coal	Steam turbine/Turbo alternator	25000	82	90	12150	ABB PPM	Unknown
Tierras Morenas Wind Power Project	Molinos De Vientos Del Arenal, S.A.	Guanacaste, Costa Rica	Wind	N/A	Wind turbine/Generators	24000	100	42	Aug: 4700000 Sep: 500000 Oct: 10000000	Siemberger Quantum Solid State kWh meter	01/07/99
Piancastagnato, 4 Plant	Enel Green Power Italy	Italy	Geothermal	N/A	Geothermal	23000	20	Unknown	10000	Sealed fiscal device	28/11/91
BP Service Station	BPSA(Pty) Ltd	South Africa	Solar Photovoltaic	N/A	PV Modules	135	100	100	4	BP supplied meter (UK approved)	01/02/02
Northern KZN concession area	Noun RAPS Utility	Umkhanyakude District (DC27), KZN	Solar Photovoltaic	N/A	PV Modules	15,75	100	20	2	RAPS Technologies, EMU	Unknown
Greenhouse Project	Solar-Fabrik (Pty) Ltd	C/o Klein and Wolmarans Street, Joubert Park, Johannesburg	Solar Photovoltaic	N/A	PV Modules	2,1	100	Unknown	0,03105	Electronic Convert 2000	12/08/02
Ceres Hydro Power Station	Witzenberg Municipality	Ceres	Water	N/A	Water turbines	1000	100	13,45	100	Sangamo C/LP	01/01/58

Source: NER website [http://www.ner.org.za/gwatts/list\\_of\\_licenses.asp](http://www.ner.org.za/gwatts/list_of_licenses.asp)

### **3.3.8 Eskom participation**

Eskom's participation in the project was considered valuable and Eskom was invited to participate – from as early on as November 2001 when the project was at a conceptual stage. Unfortunately, as indicated, Eskom eventually declined to participate in July 2002.

After an initial briefing meeting at Megawatt Park on 26<sup>th</sup> April, Glynn Morris and Charles Dingley met with Ms Vanida Govender, Eskom Corporate Environmental Affairs Manager, on 20<sup>th</sup> June, at which point Eskom undertook to consider making certain green energy generation plants available for the project (including the 660 kW wind turbine at Klipheuwel and the 25 kW Stirling Engine at DBSA). This was considered a positive step given the initial reluctance from Eskom in April / May.

However, on 4<sup>th</sup> July 2002, Glynn Morris and Davin Chown met with Mr Steve Lennon, Executive Director of Strategy and Research for Eskom, and Ms Vanida Govender, at the site of the new Eskom demonstration wind farm at Klipheuwel, near Cape Town. At this meeting Messrs Morris and Chown were informed that Eskom were not interested in participating in the project. The reasons given were that Eskom was focussing on its SABRE-Gen activities and the Johannesburg Climate Legacy project for the WSSD.

Eskom's withdrawal was disappointing but the project kept the option open for Eskom participation at any stage, should the Eskom position change at all. Unfortunately there was no shift and consequently the green generation capacity and the electricity supply to the Sandton Convention Centre and the Sandton Hilton Hotel.

## **3.4 Task 4 - Establish access to SAPP and wheeling mechanism**

The project team developed a regulatory and trading mechanism for effecting the supply of green electricity to suppliers. A discussion document was prepared by Charles Dingley (Green Light Solutions) which elaborated a mechanism of tradable renewable energy certificates (TREC's) which was based on the findings of a study of existing certificate-based green electricity trading systems and in-feed law approaches in countries such as U.S.A, Australia, U.K. and Germany.

The green electricity trading system is based on the issuing and sale of green electricity certificates. This system completely alleviates the need for wheeling mechanisms.

The initial discussion document on the introduction of a green electricity certificate solution was circulated to appropriate stakeholders such as NER, DME, Eskom and at least another 20 important players in the South African electricity industry and abroad. Dozens of responses were received from experts in SA and several other countries and Charles Dingley integrated the feedback into a final document. A copy of the final version of the discussion document is included in Annexure I.

## **3.5 Task 5 - Establish access to the distribution network**

Access to the national grid and distribution network was ensured by the NER in terms of their mandate and obligations provided for in the Electricity Act. This has been confirmed by the NER Board decision to endorse the project. At their stand at the SA

Pavilion, Ubuntu Village at the WSSD, the NER confirmed that, together with AGAMA Energy, a regulatory and trading framework for green electricity has been developed for the WSSD.

### **3.6 Task 6 - Design a green electricity tariff**

The project team prepared a discussion document laying out a proposed new green electricity tariff for supplying Green Electricity to customers at the WSSD. The document was endorsed by CityPower who applied to the NER to obtain approval for use of the tariff for their clients for WSSD. The NER granted a temporary licence to City Power to use the green electricity tariff. A copy of the discussion document is included in Annexure J.

### **3.7 Task 7 – Engage and liaise with climate change programmes**

#### **3.7.1 Liaison with the CDM**

The green electricity market and the market rules for a green power market are complementary to the mechanisms and markets for CO<sub>2</sub> emission reduction programmes within the context of global climate change initiatives.

The project established links with stakeholders in the climate change arena to ensure the complementarity and integrity of the current project.

The details of these aspects of the project are documented in Annexure K.

#### **3.7.2 Funding applications for the marginal costs of green electricity to the venues**

OneWorld Sustainable Investments approached several organisations on behalf of the project to raise contributions to fund the green electricity premium. Unfortunately, none of these approaches were successful. A copy of the Powerpoint presentation which was shown to prospective sponsors is included in Annexure L. There was interest from some large organisations but a final commitment never materialised. Most organisations approached advised that they required a guarantee of extensive advertising and publicity if they contributed. They also advised that their budgets for WSSD-related activities had been allocated by early 2002. The Green Power for the WSSD project only commenced in April 2002, four months before the WSSD. Consequently, any available WSSD-related budgets had been committed long before the approaches by the project.

#### **3.7.3 Investment conference**

A plan for a conference on Green Power was formulated, with the emphasis on:

- creating an effective programme for the implementation of 2000 MW of new green capacity, and
- highlighting the opportunities in renewable energy for investors and entrepreneurs.

A copy of the conference plan is included in Annexure M. The plan for the investment conference was discussed with potential stakeholders including the Minister of Minerals and Energy, Phumzile Mlambo-Ngcuka.

#### **3.7.4 Comments on the Draft White Paper on Renewable Energy**

Both OneWorld Sustainable Investments and AGAMA Energy provided detailed feedback on the draft White Paper for Renewable Energy to provide incentives and a more conducive environment for investment in renewable generation. Copies of these submissions are included in Annexure N and Annexure O.

#### **3.7.5 Identifying three potential projects which involve investment in renewable energy installations**

The project team, through OneWorld Sustainable Investments, identified projects with investment potential and approached a variety of potential investors in U.K., Europe and South Africa. The following three projects were identified for the purposes of this project task because their respective business plans have reached an advanced stage of development and finance has been committed by outside investors:

##### **Makhatini Flats Biofuel Project**

Located in the northern part of KwaZulu-Natal Province, this project incorporates two biomass-derived elements, namely bio-diesel and bio-ethanol.

##### **La Motte Energy Company**

Involving the La Motte Community Trust and an empowerment company in Franschoek, Western Cape Province. This combines small-scale hydro with wind and there is a related project to utilise biomass for electricity generation. The company is in the process of being structured and registered.

##### **Kouga Energy Company**

This consists primarily of a 10 MW wind farm located near Port Elizabeth in the Eastern Cape. A letter of intent from Eskom to accept the output into the grid, has been signed and financing has been committed by a wind energy company from the EU.

Negotiations for funding/investment for the above tasks have reaped positive commitments from financing sources who have committed themselves. However, due to the complicated and sensitive nature of financing business ventures, it has not been possible to obtain specific letters of commitment from prospective investors for the purposes of the project.

### **3.8 Task 8 - Monitoring and evaluation**

#### **3.8.1 Objectives**

The key objectives of this task were:

- To verify the metered results of electricity consumption of the WSSD venues between 24 August to 6 September 2002;
- To assess the contribution which green electricity had on the overall energy supply into the WSSD;
- To measure the possible reduction of energy and environmental impacts by using green electricity during the WSSD instead of conventional electricity sources; and
- To increase awareness of:
  - The four primary venues of their electricity consumption, the sources of that demand and possible alternative sources they might consider in the future based on social and environmental aspects;
  - Individuals (particularly the participants of the WSSD) of their role towards energy supply and demand; and
  - The general public awareness of green electricity.

### 3.8.2 Task activities

GEO liaised with JOWSCO and Common Ground Consulting for the identification of indicators and co-ordination of the measurement and presentation of these. The venues provided confirmation of metering facilities as follows:

**Sandton Hilton** – access to digital metering facilities

**NASREC Expo Centre** – Citypower provided the project team with a key for daily access to the digital meter.

**Ubuntu Village** – Citypower provided the project team with a key for daily access to the sub-station meter.

**Sandton Convention Centre** – provided the project team with consumption statistics at 07h00 and 22h00 every day.

Electricity consumption data was collected and analysed on a daily basis. It must be noted that the scope of the measurements were limited to the four main WSSD venues only although numerous venues and locations were employed during the Summit.

Catherine Fedorsky transmitted the data and the analysis thereof to the IUCN Greening the Summit committee by 10:30 am each day during the WSSD for inclusion on the “Consumption Barometer” which was displayed at “Greening the Summit” kiosks in various WSSD venues and on the Greening the Summit website. Refer to the website [www.greeningthewssd.com](http://www.greeningthewssd.com).

### 3.8.3 Indicators

A number of bodies set sustainable development indicators for the 2002 WSSD or reporting progress since the last Summit held in Rio in 1992. However within the energy portfolio, the main players considered for this Project were the United Nations Environment and Development Programmes (UNEP and UNDP), the E7, the International Union of Conservation Network (IUCN), and the South African Department

of Environment Affairs and Tourism (DEAT). The reasons for the selection of these bodies are:

- The WSSD is a UN-sponsored event;
- The IUCN was charged to 'green' the 2002 Summit;
- DEAT was the client for this Project; and
- The E7 represents the top 9 power utilities of the G8 countries and collaborated with the UN for the WSSD regarding sustainable development matters in the global electricity sector. The E7 implements renewable energy projects and provides capacity-building assistance to developing countries.

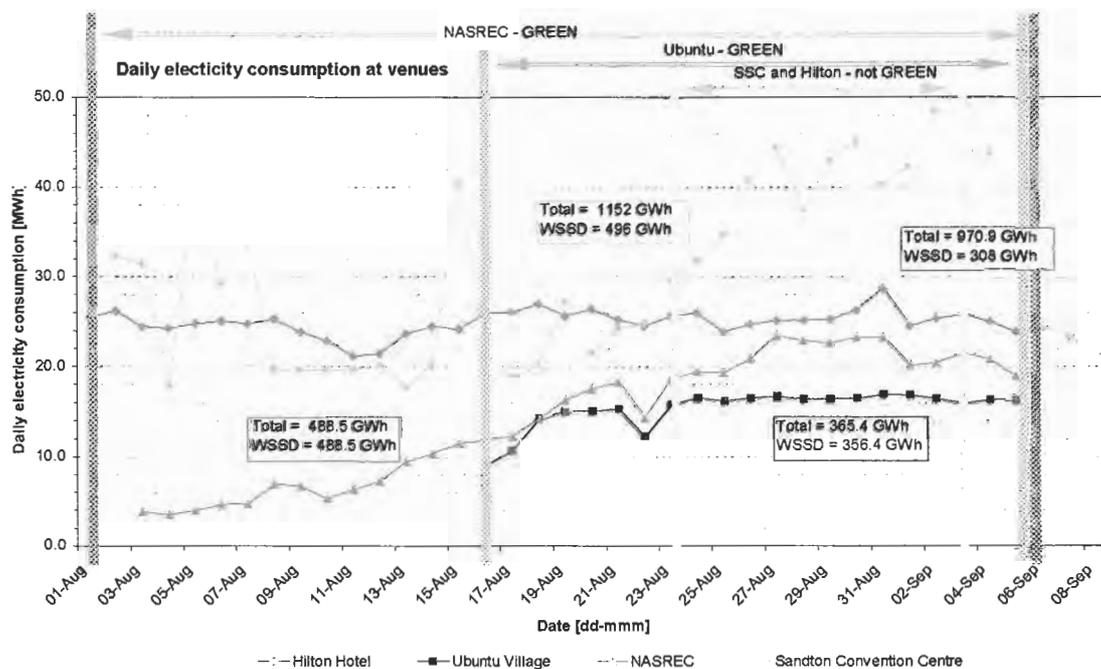
The Green Energy Project indicators considered, although not necessarily measured during the WSSD had social, economic and environmental dimensions within the focus on sustainable development. Time limitations, resource availability or financial considerations disallowed a greater number of indicators to be measured. Indicators that might be considered for such a project included but do not need to be limited to the following:

- Number of WSSD delegates registered;
- Venue statistics, e.g. number of beds occupied, number of delegates per meeting room and restaurants;
- Environmental conditions – ambient temperatures, relative humidity, etc.
- Renewable energy sources available to the South Africa power grid during the WSSD
- kWh (and in some cases, MWh) readings
  - Per WSSD delegate
  - Per venue
  - Per day
  - Per Week
  - Summit Total
- Energy use per unit of GDP (or for the WSSD)
- End-use energy prices with and without tax/subsidy
- Emissions per kWh (if stats or calculations are available):
  - Carbon dioxide avoided
  - Sulphur dioxide avoided
  - Nitrogen oxides avoided
  - Particulates avoided
  - VOCs avoided

- Hydrocarbon emissions avoided
- Hazardous air pollutants avoided
- Water
- Consumption avoided (vs that used by conventional power)
- Consumption per venue
- Consumption per delegate
- Land taken up by the energy facilities and/or infrastructure
- Energy Resource depletion avoided

### 3.8.4 Consumption and impacts

The overall consumption of the four venues is shown in Figure 3 below.



**Figure 3:** Electricity consumption of the WSSD venues before and during the WSSD event

The overall electricity consumption of the four venues during the periods of WSSD activity was 1649 MWh. Of this, 845 MWh of green electricity was supplied to the Ubuntu Village and the NASREC Expo Centre of which 58 MWh was new green generation. A more comprehensive summary of the consumption at each venue is presented in Annexure P.

The resource savings and emissions reductions achieved by the project are those associated with the coal-fired electricity generation which was displaced by the 58 MWh of new green electricity generation which was supplied through the project.

These are summarised below:

	Electricity Consumed MWh	Avoided consumption		Avoided emissions				
		Coal tons	Water kilolitres	CO2 tons	Ash (dumped) tons	Ash (airborne) tons	SO2 tons	NOX tons
		Overall consumption of Green Electricity at WSSD	844.84	414	1022	651	110	0.296
Electricity derived from new green generation	58	28	70	45	8	0.020	0.5	0.2
Electricity derived from existing green generation	786.84	386	952	606	102	0.275	6.3	2.8

Although relatively small, these impacts are significant in that they have established a mechanism for scaling up the small, but real, contribution achieved here.

### 3.9 Task 9 - Project documentation

The project documentation comprised:

- The grant agreement (as amended)
- The inception report
- Four progress reports
- The final project report

All relevant project documents are attached hereto as Annexure Q to Annexure U.

Records of all financial transactions have been kept and are available on request.

### 3.10 Task 10 - Public Awareness campaign

The project implemented a comprehensive public awareness campaign through Galeforce Communication. This campaign was based on a comprehensive public awareness/media plan which was developed by AGAMA Energy and Galeforce Communication. A copy of the plan is presented in Annexure AA.

#### 3.10.1 Briefing documents

Five briefing documents were distributed. These are included in Annexure V to Annexure Z.

#### 3.10.2 Print media

Immediately after the project inception articles were submitted to several magazines to meet their deadlines for publication in August and September. ESI Africa magazine (the power journal of Africa) requested and were sent an article on the project. Acumen magazine interviewed the project team for an article in their next edition. Urban Green File and Odyssey magazine also published articles on the project. Advertisements appeared in Business Day and ESI Africa calling for green electricity suppliers.

An advertisement for the project was placed in, one of the official WSSD publications – The SA Development Handbook. Copies were to be given to approximately 50% of the delegates.

A more comprehensive account of the articles which appeared in the print media are included in Annexure BB. This list is not exhaustive because articles are still appearing in publications. Clippings of all media articles are available for perusal. The press clippings file was sent to a media agency to be audited i.e. for the advertising value of the project coverage to be formally assessed. The estimated value of the press coverage is R484 000.00 based on column centimetres, page coverage and circulation.

### **3.10.3 Radio and Television coverage**

The project team obtained good radio coverage for the project. Specific coverage included:

- SAFM, John Richards
- SAFM, interview with Glynn Morris 12 July and 14 July 2002
- Bush Radio, interview with Glynn Morris on 12 July 2002
- Radio CCFM, interview with Glynn Morris on 17 July 2002
- Radio Panorama, interview with Glynn Morris on 20 August 2002
- ALIX FM, interview with Glynn Morris 15 August 2002
- East Rand Stereo, interview with Glynn Morris 16 August
- Rainbow FM, interview with Glynn Morris 15 August 2002
- Radio Khwezi, interview with Glynn Morris 16 August 2002
- Radio Zibonele, interview with Catherine Fedorsky, 19 August 2002

Furthermore, the project achieved excellent television coverage including, but not limited to:

- Summit Television, interview with Glynn Morris, 1 August 2002
- e.tv, interview with Glynn Morris, 13 August 2002. eTV interview flighted on several occasions
- SABC 2, WSSD slot, interview with Mark Harris, 26 August 2002
- 50/50, interview with Mark Harris, 26 August 2002
- WSSD 60-second insert, Mark Harris, 26 August 2002
- Proposals were also sent to Carte Blanche and to SABC1 for interviews and features.

- Moshoeshoe Eco-Village in Kimberley has received substantial TV coverage on SABC and eTV. The wind and solar systems installed by AGAMA Energy in Moshoeshoe Eco-Village are providing green electricity for the project.

#### **3.10.4 Patrons**

Thirty possible patrons for the project were approached. Five accepted and several expressed interest. Some declined due to the fact that patronage was solicited on a voluntary basis and they expected some compensation for lending their names to the project. However, all parties approached were provided with briefing documents giving information on the project and green power in general.

The four patrons included:

- Andrew Kelehe (SAPS runner from Mafeking, Comrades Winner 2001)
- Roda Khodalie (prominent SA public figure and civil society activist)
- Annita Roddick (international businesswoman, CEO of The Body Shop, global activist)
- Tony Weaver (prominent SA-based journalist)
- Archbishop Desmond Tutu

Given that most prominent people approached to be patrons were either too busy to accept or their agents required payment of substantial amounts and due to the project team's decision that no payments to patrons would be made, it became difficult to confirm many new patrons. Furthermore, due to the budget constraints resulting from currency fluctuations, the team decided to spend constructive time engaging in other, more important aspects of the project. However, the exercise of approaching and briefing prospective patrons definitely raised the consciousness of people about the project and the issues of greener energy services.

#### **3.10.5 Conferences, workshops and seminars**

The project was represented at a number of events.

On 15<sup>th</sup> May 2002, Glynn Morris addressed a press conference hosted by SECCP (Sustainable Energy & Climate Change Partnership) entitled "WSSD Press Briefing on Energy Issues & Launch of the SA Energy Sustainability Indicators Report". A comprehensive press release was distributed to the media attending the event.

On 19<sup>th</sup> May 2002, Glynn Morris addressed the LAMNET conference in Kwazulu Natal (hosted by the SA Sugar Association) on the project and on the opportunities for sugar producers to generate power and participate in a green electricity market.

He also presented a paper at an international seminar on Tradeable Renewable Energy Certificates at the WSSD. A programme is attached in Annexure DD and a copy of the presentation is attached in Annexure EE.

### 3.10.6 Visibility at the WSSD

DEAT had advised that the project would be showcased on the DEAT stand at the SA Pavilion in the Ubuntu Village and the project briefed DEAT with details for posters on the project. On arrival at the SA Pavilion the project was advised that DEAT had shelved their plans due to lack of space. Consequently, the project team designed a new poster and flyers describing the project and displayed them on the AGAMA Energy stand.

The AGAMA Energy stand in the SA Pavilion, shown in Figure 4 was primarily used to highlight the Green Power for the WSSD project and provided an opportunity to engage with a variety of influential people including the Minister of Minerals and Energy.

The AGAMA Energy stand was not funded out of project expenses but provided a useful presence for presenting the project to interested WSSD delegates and project stakeholders.



Figure 4: AGAMA Energy stand at the WSSD

### 3.10.7 Other events

Briefing documents emailed to many stakeholders, government departments, environmental organisations and influential individuals.

Glynn Morris, Gail Jennings and Belynda Hoffman attended a breakfast briefing by the Chairman of Eskom, Mr Reuel Khoza on Thursday 11<sup>th</sup> of July 2002 and subsequently met with him to appraise him on progress on the project.

**3.10.8 General**

Members of the project team participated in the Western Cape's schools fair on World Environment Day in Malmesbury on 5<sup>th</sup> June 2002, providing talks to groups of schoolchildren on the relevance of renewable energy and the significance of the WSSD.

**3.10.9 Online e-news**

The project was featured on many e-news for a such as in the RE Focus electronic newsletter.

## 4 Conclusions

Based on the project experience, the following conclusions are relevant:

- The Green Power for the WSSD Project succeeded in opening up the beginnings of a new era of differentiated electricity service offerings by delivering 845 MWh of green electricity to two of the main venues of the WSSD within the context of a regulatory and trading framework for green electricity (or green power) which was adopted and implemented by the National Electricity Regulator.
- There is substantial interest among all stakeholders in a green power market in the southern African region.
- The project has provided a stimulus to the development of government's White Paper on Renewable Energy which is currently under submission to the Cabinet.
- This project is significant in that it has pioneered a completely new approach to the generation, sale and purchase of electricity in South Africa. Although it constitutes a departure from the current system, it is directly in line with the government's new policies. This is apparent from the Department for Minerals and Energy's call for proposals for the restructuring of the Electricity Supply Industry (ESI), on 15<sup>th</sup> June 2002.
- The major challenge was the need to design a new system, obtain the consent and support of the authorities and implement the system in the space of four to five months. Due to the time constraints, the final dates for achievement of monthly deliverables had to be extended by a few weeks in some cases. These extensions were unavoidable due mainly to the reliance on responses from other parties such as Eskom, NER, venue management and green electricity generators.
- The project team met with some uncertainty but also with a great deal of enthusiasm from different sectors of the ESI. The main challenge and constraint was the short space of time. However, the grant objectives were met and the project is already proving to be a catalyst for fast tracking change towards renewables in the ESI.
- The project has elicited significant interest and comment.
- The overall objective of the project was to develop a regulatory and trading framework for the development of a green power market in South Africa (as a stimulus for investment in new renewable energy generation capacity as per the DME's policy) and, furthermore, to test the effectiveness of this regulatory and trading regime with the practical example of supplying green power into the main venues of the WSSD.
- This report indicates that, not only were the grant objectives were achieved, but many targets were exceeded.

- The adage 'what gets measured, gets managed' may hold true then determining the green electricity indicators for the WSSD. The information from the measurements will set a precedent for subsequent Summits. No Summit has ever provided green electricity for the proceedings nor measured the contribution towards electricity consumption and various associated environmental impacts. The Green Power Project along with the Greening of the Summit Project together contributed towards establishing a base of information from which future United Nations international forums can be benchmarked.

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# TRECs in Southern Africa

## The catalyst for a green power market in southern Africa?

### Green Power for the WSSD – A Pilot Project

a project grant under the DEAT climate change program funded by USAID

Glynn Morris – AGAMA Energy (Pty) Ltd



# The context

- The RE sector in SA is a cinderella industry

- It is a real business sector in the SA economy - but very small at present, say approx. R100 million per annum

- It is probably stagnant or shrinking in real terms (no reliable stats - hard to tell)

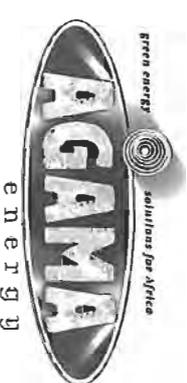
- The potential for excellent economic growth is twofold

- sectoral growth of the industry itself
- added value to other sectors

- Environmental considerations - mostly very positive

- Government policy is essentially conducive to growth of the sector

- There is no investment pull to grow the sector in SA



# The opportunity

The SA Department of Minerals and Energy has suggested a targeted minimum increase of 5% of primary energy over the next decade (from 9% to 14% by 2012) in the proportion of Renewable Energy supplied into the South African economy

- The long term goal is to shift the South African energy economy towards a more sustainable mix of energy supply systems
- Integrated energy planning scenarios indicate a requirement for an overall energy supply of 3800 peta Joules (PJ) by 2012
- The DME's minimum target implies an estimated 190 PJ of new renewable energy and, within this, a new electricity generation capacity requirement of around 4000 MW
- This corresponds to an investment of between US\$4 - 6 billion of investment, i.e. an average investment of US\$400 – 600 million per annum for the next ten years
- This excludes any new investments in new green electricity generation capacity in the southern African region



# The project objectives

- establish a regulatory and trading context for a green power market in SA
- facilitate a pilot project to test the interest and functionality of this framework
- reduce the negative effects of energy services provision to the WSSD
- stimulate investment in new green power generation systems in South Africa
- develop capacity and skills in the green power sector



# The project plan

- Determine the energy service needs of the WSSD venues
- Develop a green electricity trading mechanism
- Develop the criteria for certification of green generators by the NER
- Develop a green electricity tariff
- Identify and source green power generation capacity in SA
- Liaison with CDM initiatives
- Monitoring and evaluation
- Public awareness



# The project partners

The Department of Environment Affairs and Tourism

USAID

JOWSCO

Greening the WSSD Project

Venues

Sandton Convention Centre

Hilton Sandton

NASREC Expocentre

Ubuntu Village

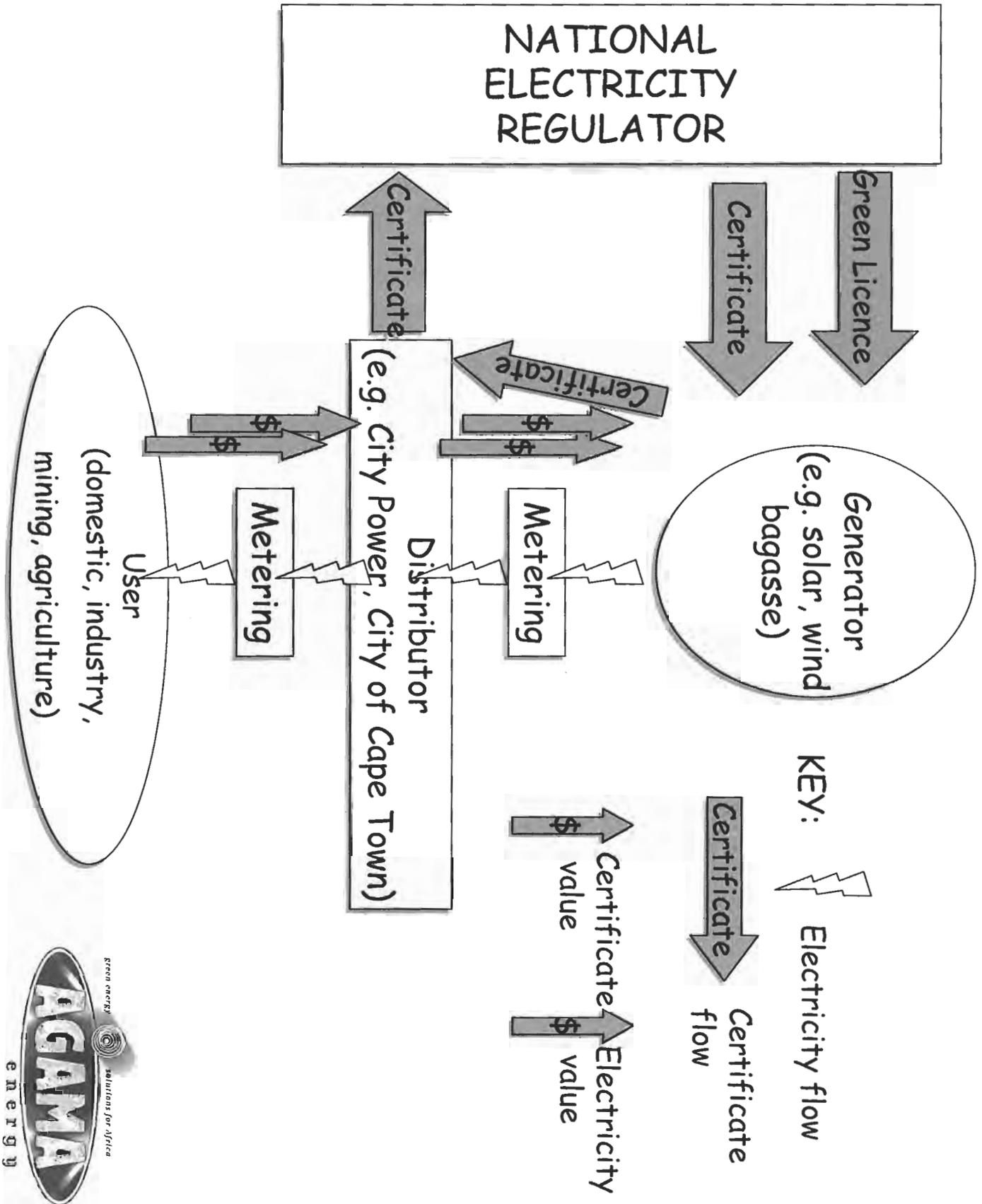
National Electricity Regulator (NER)

City Power

Green Power generators

Media





# The demand and tariff

## Demand

- All four main venues committed to participating
- Two venues supplied by City Power were included:
  - Ubuntu Village: 700 – 900 MWh over 29 days
  - NASREC Expo Centre: 1190 MWh over 39 days

## Tariff

- A simple energy based tariff
- On a voluntary basis
- Up to a maximum of 50c/kWh



# The sources

- Registration of >60 MW of green power generators with the NER including:
  - 13 new individual solar PV systems in southern Africa including a system for the GreenHouse Project
  - 1 new wind electricity system in Kimberley
  - 2 existing hydropower systems in W Cape and Mpumalanga
  - 5 existing bagasse co-generators in Kwazulu Natal
  - 1 symbolic trade from a wind system in Costa Rica
  - 1 symbolic trade from a geothermal system in Italy
- More registrations in progress



# The questions

Will the state commit to the targets in the draft White Paper?

What is the scale and nature of the market for green power in southern Africa?

- A mandatory market (a renewable energy portfolio)?
- A voluntary market (public sector and corporate sector)?

How is a 'grid-feeder' approach accommodated?

- What are the synergies, regulatory and marketing implications of a CER market and a TREC market in SA?
- How are off-grid electricity generators and DSM initiatives included?
- How quickly can the WSSD experience be integrated into the core business of the NER and RERA?
- What is the long term opportunity for international trades?



licensed and have registered sufficient Green Watts certificates to adequately provide the power for the WSSD project.

## **Task 10 – Public Awareness Campaign**

### **Briefing document**

A further briefing document which was distributed to the public during the WSSD is attached hereto. This document is not available in an electronic format so it will be attached to the hard copy of this report.

### **Radio and Television project coverage**

#### Radio

SAFM, John Richards, SAFM, interview with Glynn Morris 12 July and 14 July 2002

Bush Radio, interview with Glynn Morris on 12 July 2002

Radio CCFM, interview with Glynn Morris on 17 July 2002

Radio Panorama, interview with Glynn Morris on 20 August 2002

ALIX FM, interview with Glynn Morris 15 August 2002

East Rand Stereo, interview with Glynn Morris 16 August

Rainbow FM, interview with Glynn Morris 15 August 2002

Radio Khwezi, interview with Glynn Morris 16 August 2002

Radio Zibonele, interview with Catherine Fedorsky, 19 August 2002

#### Television

Summit Television, interview with Glynn Morris, 1 August 2002

e.tv, interview with Glynn Morris, 13 August 2002

SABC 2, WSSD slot, interview with Mark Harris, 26 August 2002

50/50, interview with Mark Harris, 26 August 2002

WSSD 60-second insert, Mark Harris, 26 August 2002

### **Patrons**

Archbishop Desmond Tutu has contacted the project team and agreed to be a patron to the project.

## **3. Conclusions**

The project objectives have been attained and, in most cases, exceeded. As a result, the project can be seen to be a success and, in addition to the successful attainment of the project outputs, the outcomes will have a significant impact on the future of the energy sector in South Africa and the southern African region. A further observation is that the project team members provided input which far exceeded the time allocated in the project budget, through a genuine interest and dedication to the cause of alleviating negative climate change impacts on the world.

**GREEN POWER**

**FOR THE**

**WORLD SUMMIT ON SUSTAINABLE**

**DEVELOPMENT**

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**ANNEXURES – Volume 2**

November 2002

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## **Annexure N. – OSI Comments on the Draft White Paper**



**OneWorld**  
Sustainable Investments

***Comments on the  
Draft White Paper on the Promotion of  
Renewable Energy and Clean Energy  
Development***

*12 July 2002*

Appreciating your natural, social and financial assets



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## Introductory comments

### Overview

This document contains the comments on the White paper on Renewable energy as prepared by One World Sustainable Investments and its partner organisations, Genesis Eco-Energy and Sudor Eco-Ventures.

The structure of the document highlights the key areas where we felt comment is needed and mirrors the structure of the White Paper for ease of tracking.

The comments have been prepared based on the inputs from practitioners within various lines of business within OSI, most notably, energy & environment professionals, social investment practitioners and sustainable investment practitioners.

General issues that need to be addressed in the **focus and scope** of the White Paper:

- **Tone:** The tone of the document comes across as defensive and reactive. We would prefer an approach which is one of **bold, visionary leadership** by DME – “Claiming the renewable energy space”. This would provide a more proactive approach to developing the sector;
- **Drivers:** There is a strong focus on climate change as a driver for the development of the sector. A stronger inclusion and recognition of the broader environmental, health and social aspects of the current problem as a driver for renewable energy development should also be included;
- Stronger emphasis on mobilising both state, parastatal and private sector investment for the development of the RE sector: the role should be one of **investment facilitation and enablement**;
- **Benefits case:** Greater focus on stating what **the benefits of the RE White Paper**, and resultant development of the sector, are going to be: i.e. what do you expect to achieve in job creation, GHG reduction, industry and small enterprise development, rural economic development;
- The paper could also make extensive use of schematics in order to make it more understandable and to provide users and readers with clear ideas as to governments timetable for implementation;
- **Government role:** governments role in the commercialisation of technology should be clearer;
- **Fast tracking IPP's:** A stronger. More visionary role in fast tracking the set-up and implementation of IPP's should be evident;
- **DME set-aside programme:** this paper and the programmes of action herein should be integrated with the set-aside programmes envisaged within DME;
- **DME market kick-start:** DME could use this paper to signal its intention to commit to buying significant quantities of RE and thus facilitate the creation of the RE market in South Africa.

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## Executive Summary

We believe that the executive summary, and the document as a whole should reflect a position from the DME which facilitates investment into the sector. There could be a greater focus on *Investment Facilitation* and *Developing an Enabling Environment for Investment* in this section.

We believe strongly that the targets being set for the increase in RE use should reflect a percentage (as is, but increased to 10% minimum), and translate this into a net figure to fully explain how this will be derived and over what period (i.e. an incremental implementation time frame)

Changes we envisage in the section:

- **Page vi:**
  - **Para 3: Targets** – should be more aggressive and visionary in order to stimulate investment to the scale necessary for the industry to seed and grow. We suggest an increase of 10% within the stated time frame i.e. 10 years;
  - **Para 4:** The targets should be meaningful and should show vision in order to inspire confidence in the strategy. Sentence should read: “The starting point will be a number of early win investments spread across both low cost technologies as well as technologies with larger scale application”;
- **Page vii:**
  - **Para 1:** Focus should be on CDM as well as other investment channels from private sector investment houses, not solely focused on bi-lateral or multi-lateral mechanisms
  - **Para 2:** The time frames to stimulate significant private sector investment are too vague and drawn out. The statements should support a strong visionary leadership approach from the DME and not leave it to market or other environmental forces to determine the approach by government to developing the sector.

The suggested changes in the remainder of the paper will be included in the executive summary.

## 1. Introduction

### 1.1 Vision:

There should be the inclusion of **energy efficiency and conservation** included in the vision, with a focus on the **development of a bulk renewable energy sector** as well as smaller scale applications to support affordable access. The vision leaves developers with the impression that the focus is on small scale applications for rural development, and thus relegates renewable energy to applications which are small scale, off-grid only

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## 1.2 Definition of RE:

The definition should include wave power, and subsequently should provide for a paragraph explaining the potential of this resource given its abundance, and the focus for investment from many quarters.

### Amendments:

- We would prefer that the opening sentence either list all possibilities or that it be changes to : "RE includes, but is not limited to the following sources....."
- You may also want to include references to local and international work being done to clearly define green or renewable energy, such as the work done by Agama Energy for the World Summit

## 2. Purpose of the Policy

The overall amendments are listed:

- **Page 3, Para 1:**
  - include short and long term time frames to display incremental approach to delivering tangible results;
  - define programmes, targets, deadlines and milestones that indicate the nature of the targets.
- **Page 3, Para 2:**
  - The focus should be on health, social and environmental impacts, and not solely on climate change as a motivation for supporting renewable energy investment and development.
- **Page 3, Para 3:**
  - **Conversion and utilisation.** The sentence should read: "At present, the CONVERSION and the UTILISATION, of these resources....". Our motivation is that the conversions of RE sources (solar, wind, wave etc) are expensive to convert into productive use (i.e. the building of wind farms, wave conversion facilities etc) in order to capture the energy from these sources. The utilisation can be less of a hurdle one the pricing of conversion is rectified.
- **Page 3, Para 3:**
  - **Financing.** The focus should also be on interesting international and local investment and financing institutions and not relying solely on grant or donor funding. The focus is not solely driven by climate change but also through other finance interests.
- **Page 4, Para 4:**
  - **Target.** Should be increased to at least 10% and to broaden the definition for sourcing (wind, wave, biomass, solar, co-generation etc) in order to ensure that investment and financial partners see the potential for supporting RE.

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## 3. Policy Development

### 3.1 Development process

Given the objective of “diversification” and “development of large-scale RE supply”, the 5% target does not fully support this objective as the focus in the White Paper is on “starting point will be small, limited number of “quick win” projects”. We believe the objective should be to scale fast in order to attract the right level of investment and provide significant evidence that renewable energy can be a worthwhile investment.

### 3.3 Renewable Energy Potential

- **Page 6, Para 2:** “One of the objectives.....”
  - This sentence should be included in the vision and goals, and should also address the development of social and environmental goals through implementation of modern RE technologies.
- **Page 9, Para 1**
  - Change to: “ RE can be generated either centrally OR on a decentralised basis, or through stand-alone options, and distributed.....”
- **Page 9, Para 2**
  - Add to bullet points:
    - Investment facilitation and development of an enabling environment for investors;
    - Public Awareness and the creation of a wide spread demand for green electricity in various sectors of the economy, from government, to industry, to commercial and residential users.

## 4. Setting the Context

### 4.1 National Context

- **Section 4.1.2: Page 12, Para 2**
  - Add to bullet points:
    - Development of the renewable energy sector and incentives to support this development.

---

## 4.2 International Context

- **Section 4.2.3: Page 15, Para 1**
  - Add to paragraph and include:
    - “The challenge facing government.....create a policy framework with appropriate legal, fiscal, **investment and diversification targets**, regulatory instruments to attract.....”.

## 5. Barriers to Renewable Energy Implementation

Introductory paragraph on barriers should include:

- Full cost accounting for non-Re technologies and fuel sources;
- Insufficient understanding and experience in the technology uptake cycles and implementation.

## 6. Essential Elements of RE Implementation

This section should include two sub-sections:

**Investment Facilitation** which is a key role that government will need to lay in order to attract additional partners into the industry and its development;

**BEE, skills transfer and industry development** which is key to ensuring the development of a broad based industry.

### 6.1 Sustainable Development

- **Page 17, Para 1**
  - Add to paragraph:
    - There is a need to develop indicators of the benefits of renewable energy to sustainable development. Monitoring and measuring of these benefits must be included in the renewable energy roll-out plan and implementation framework;
- **Page 17, Para 2**
  - Add to paragraph:
    - Renewable energy must be converted to useable energy in a sustainable manner that supports the implementation of the sustainable development strategy for South Africa.

---

- **Page 17, Para 3**

- Add to paragraph:

- A shift in fiscal policy and direction is needed in order to ensure appropriate allocation of resources to productive aspects of the economy, such as the development of a renewable energy manufacturing and generation industry;
- An additional challenge is in stimulating industry participation in the RE industry as well as investment by new investors and participants in the sector in order to speed up the process of acceptance of the need for renewable energy technologies.

## 6.2 Enabling Environment

- Page 18: Add a paragraph describing HOW government will establish the initial market share for RE by building on the example regarding the bio-diesel levy.
- Page 19: Re-phrase, as the NER has opened up the grid to access by certain energy providers (e.g. Tongaat Hulett's Maidstone Mill) "The barrier of non-discriminatory open access to the grid WILL be overcome through the DIRECTED EXPANSION of the process of accelerating the implementation of power purchase agreements....".

## 6.3 Institutional Arrangements

- **Section 6.3.1: Page 20, Para 2**

- Add to paragraph and include:

- "However, the appropriate regulatory, **tax and investment incentive, market development programme**, and legal framework will be needed to support the entry of renewable energy generators".

- **Section 6.3.1: Page 20,**

- Add a paragraph:

- "The preliminary regulatory and trading framework developed for the World Summit on Sustainable Development by DEAT should be used and tested within the South African environment".

- **Section 6.3.2: Page 22,**

- Add a number of key points to last paragraph

- Include Innovation Fund as a source for technology development
- Stimulate and facilitate the creation of new vehicles and institutions for the furthering of industry development
- "Government will provide leadership by setting supply and demand....."

---

## 6.4 Information

This paragraph should be corrected as there is not significant use of renewable energy in South Africa. The bulk of the paper goes to show this, as do a range of other studies. The paragraph should focus on the fact that there is "LIMITED USE OF.....".

Monitoring, verification and openness to data should be enshrined in the White Paper.

## 6.5 RE Technologies and Applications

The application of technologies is limited to those supported by government. These should be broadened and made more inclusive for other technologies. This section should NOT LIMIT the technologies being considered by government.

- **Page 22, Para 1;**
  - Add clarity on which technologies are well developed e.g. wind, solar;
  - List priorities or leave open to add a programme of action and roll-out programme for government.
- **Page 23, Para 2;**
  - Technologies are too narrow and do not include options for large scale financially viable sources of renewable energy. Either include all technologies, or generalise the statement in order to leave the section open to a range of technologies without limiting the various options.

## 7. Strategic Goals, Objectives and Deliverables

This section should include two sub-sections which are not present. These two areas will be critical to draw in resources for technology development and commercialisation for application at various scales, both off-grid, and bulk renewable energy development.

- **Establishment of an Investment Environment;**
- **Incubation for Technology Development;**

The section on deliverables should move away from "analysis" and "investigation" to one of concrete delivery and implementation with clear time frames, milestone and investment targets such as "to finance 10% of RE by 2012 through....."

---

## 7.1 Financial Instruments

Page 27: **Objectives**, should include the point above:

- To facilitate the development of an investment climate for the development of the renewable energy sector, which will attract foreign and local investors;
- To support the incubation, development and application of renewable energy technologies through the creation of tax and other incentive schemes ;

## 7.3 Technology Development

Page 30: **Deliverables** :

- Need to be more action and implementation oriented with clear targets;
- ADD to bullet 3:
  - “ **Develop, drive, support and monitor** the implementation of research and..... ;
- Add to bullet 4:
  - “**Identify and facilitate the implementation of appropriate** public, private partnerships....”

## 7.4 Awareness Raising, Capacity Building and Education

Page 31: **Objectives** :

- To promote and stimulate the RE market through the dissemination of information regarding the **economic, environmental social and trade benefits** of RE technologies and their applications.

Page 31: **Deliverables** : Add a bullet point:

- Development and dissemination of a “Benefits Case for Renewable Energy”.

# 8. Cross Cutting Issues

## 8.1. Energisation

Page 32:

Add bullet point of sub-heading focusing on what will be done within a certain time frame to establish these lending and financing agencies.

## 8.4 Trade and International Co-operation

Page 35:

Support this through a programme of action. Thus ADD the following as clear actions rather than statements of interest:

---

- 
- “Facilitate the development of a manufacturing industry for the production of wind turbines and other renewable energy technologies in South Africa by supporting local developers and manufacturers via financing and fiscal incentives schemes”.

## 9. Governance and Partnerships

### Central Energy Fund

The Fund should be tasked with partnering with local agencies and development partners in the establishment of a range of funds to support the development of the RE sector. This should be explicitly stated in this section.

## 10. The Way Forward

Page 38, Paragraph 3:

- **This paragraph contradicts, and diminishes, the focus on the paper by appearing to subvert the overall intention of the paper** in that it states “ government will use a phased approach to.....renewable energy projects that are well developed and have a satisfactory return on investment”.

Currently the industry needs government support to achieve these very objectives in the first place. The entire focus of the paper, and the development of the industry encapsulated therein, recognises the need or government support in ensuring that projects are well developed and in turn can then produce a sufficient ROI.

The sentence should be amended to read:

**“Government will use a phased, managed and partnership approach to renewable energy projects that are well conceived and show the potential to provide acceptable social, environmental and financial returns for all stakeholders and investors”.**

## **Annexure O. - AGAMA Energy Comments on the Draft White Paper on Renewable Energy**



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27 September 2002

Department of Minerals and Energy  
Private Bag X59  
Pretoria  
0001

**Attention:** Tony Golding and André Otto

Dear Tony and André

## **COMMENTS ON THE DRAFT WHITE PAPER ON RENEWABLE ENERGY**

I hereby submit comments on the Draft White Paper on Renewable Energy for consideration in the process of finalising this policy document. I apologise for the delay in getting these back to you but I have been travelling and only returned on Friday 4<sup>th</sup> October.

### **1. Preliminary comments**

The process of developing a broadly accepted national policy on renewable energy within the South African energy economy is an important and necessary initiative by the Ministry of Minerals and Energy and the DME.

A strong state policy on RE is important as a basis for providing more sustainable energy services to the people of South Africa, but more critically it establishes a government commitment to a more progressive and visionary approach to the provision of sustainable energy services within the global social, economic and environmental context.

Directors: **G J Morris**, MSc Energy Studies (UCT) • **B S Morris**, BA (Oxon)

Company registration No: 2000/029294/07



This creates an opportunity for dialogue and debate which is a critically important process at a time when we can make good decisions which will guide us for years to come.

## **2. Specific comments**

### **2.1 The nature of the White Paper**

Rather than re-stating the context, the nature of the White Paper should:

- Locate the document within the context of other policy by reference to these
- Locate the document within the context of the existing information on resources, the SA energy economy and technical options by reference to existing documents
- Identify the specific goals and objectives of the RE White Paper in terms of the desired effects of this policy statement, i.e. job creation, new investment, national reductions in negative environmental effects (resource consumption, waste production, GHG, particulates, etc.), health and safety, etc.
- Suggest a medium-term target, say 10 years, and a long-term target, say 25 years, which should be stated as scenarios, i.e. nature of the SA energy economy and the role of RE, quantified contribution to national energy service needs by RE, a breakdown of the likely technical supply options and a likely roll-out plan.
- Commit to a process, including capacity building, for monitoring the process and re-visiting the policy as the RE initiatives unfold

This kind of document would have the effect of focusing all stakeholders' attention on the desired outcomes and a suggested scenario for these outcomes without prescribing the manner in which these outcomes are achieved. This approach would maximise the possibility of innovation and entrepreneurial thinking in delivering these outcomes. The monitoring, evaluation and stakeholder participation would facilitate an optimal delivery of these outcomes.

### **2.2 The targets for Renewable Energy**

The draft white paper indicates a medium-term target of 10 000 GWh by 2012. Discussion with colleagues suggested that this was intended as 10 000 GWh cumulatively over the next ten years. This target would be meaningless in quantitative terms as it would hardly make a dent on the overall consumption in 2012<sup>1</sup> - it would be business as usual. A more challenging and meaningful target would be a contribution of 10 000 GWh/annum in 2012.

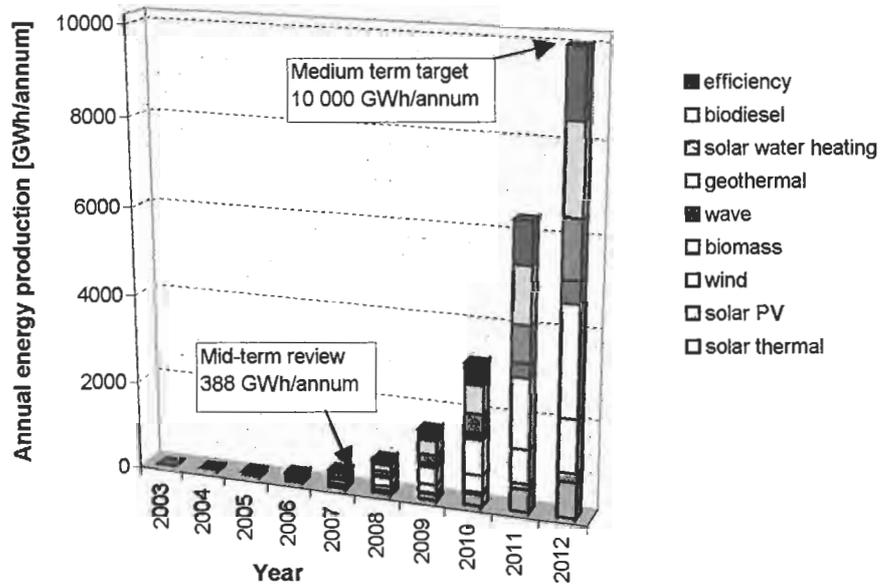
Furthermore, the white paper should rather make some specific suggestions on the preferred mix of RE to make up the targeted RE contribution – the likely scenario.

---

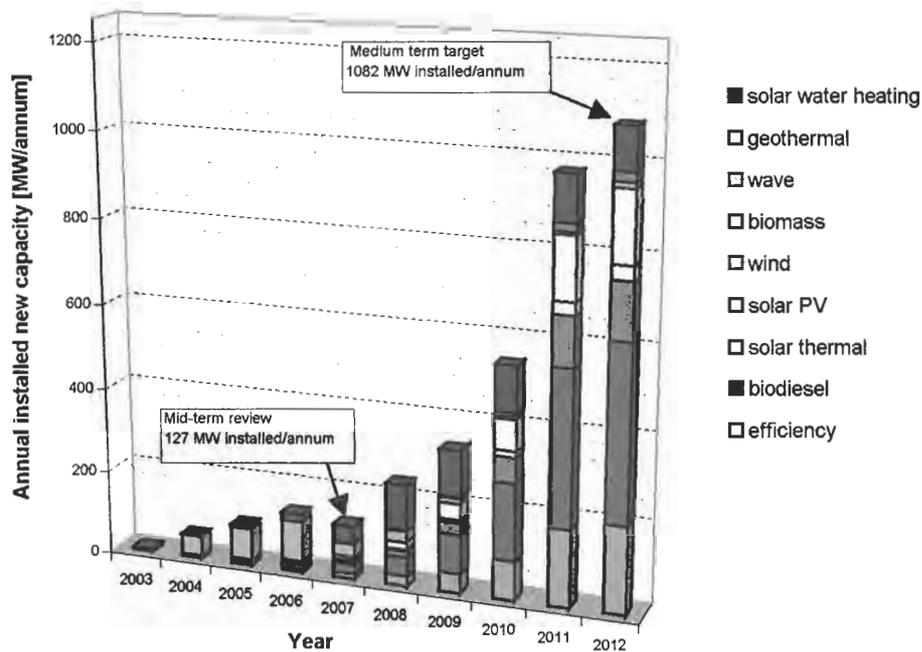
<sup>1</sup> current electricity production in SA is about 195 000 GWh, with approximately 1% from hydro and bagasse

The following charts indicates a likely scenario (underlying spreadsheet is attached for your reference and use). Figure 1 presents the scaling up of new RE energy consumption over time.

Figure 2 indicates the required annual additional installed generation capacity required.



**Figure 1:** Annual energy consumption of new RE energy over time



**Figure 2:** Annual installed new RE generation capacity over time

### 2.3 The establishment of Tradeable Renewable Energy Certificates as a mechanism for delivering more sustainable energy services

The establishment of a regulatory framework and administrative mechanism for tradeable renewable energy certificates (TRECs) by the National Electricity Regulator (NER) provides an immediate opportunity for rolling out a range of green power services. These sustainable energy services will not only provide essential energy service needs in a manner which supports the government commitment to RE but the TREC approach can deliver more than only green electricity services but also solar water heating, off-grid electricity generation and DSM activities. It also allows for grid-feeder stimuli to encourage medium-term structured development of the sector. The TREC approach and the in-feed law approach are NOT mutually exclusive and the in-feed laws provide the structuring of the sector and the immediate investor confidence for new generation capacity.

The overwhelming advantage of the TREC approach is that it is the emerging international standard and opens up the potential for regional and international trades. This has massive developmental implications for South Africa and southern Africa (refer to [www.treckin.org](http://www.treckin.org)).

### 3. Conclusions

Please contact me to discuss any of these issues and I look forward to the finalisation of the policy process and, ultimately, the publication of the RE White Paper.

Yours sincerely

GLYNN MORRIS  
**Managing Director**

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## Scenarios for meeting the RE targets in the Draft White Paper on Renewable Energy

**Suggested target:** 10000 GWh per annum  
**Time frame:** 10 years  
**Year of inception:** 2003



### Assumptions:

solar space heating / cooling is excluded in this analysis  
 the target refers to new RE capacity delivered per annum in final year

	Load factor %	Suggested proportion %	Final mix GWh/annum	Installed capacity MW	Year 1 2003	2 2004	3 2005	4 2006	5 2007	6 2008	7 2009	8 2010	9 2011	10 2012	
<b>Energy efficiency and conservation</b>															
efficiency	30%	15%	1500		2	6	13	28	58	118	238	478	958	1500	3399
<b>Biofuels</b>															
biodiesel	20%	20%	2000	571	1	1	3	6	11	23	46	91	183	206	
					3	8	18	38	78	158	318	638	1278	2000	4533
<b>Green electricity</b>															
				1142	1	3	6	11	23	46	91	183	365	413	
solar thermal	25%	8%	800	365	1	3	7	15	31	63	127	255	511	800	1813
					0	1	2	4	7	15	29	58	117	132	
solar PV	25%	2%	200	91	0	1	2	4	8	16	32	64	128	200	453
					0	0	0	1	2	4	7	15	29	33	
wind	30%	12%	1200	457	2	5	11	23	47	95	191	383	767	1200	2720
					1	1	2	5	9	18	37	73	146	165	
biomass	90%	25%	2500	317	3	9	22	47	97	197	397	797	1597	2500	5666
					3	48	76	95	32	25	13	6	6	13	
wave	95%	5%	500	60	1	2	4	9	19	39	79	159	319	500	1133
					0	0	0	1	1	2	5	10	19	22	
geothermal	98%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	
<b>Solar water heating</b>															
solar water heating	25%	13%	1300	594	2	5	11	24	50	102	206	414	830	1300	2946
					1	1	6	18	42	107	107	107	107	99	
					13	38	88	188	388	788	1588	3188	6388	10000	22663
<b>Total per annum</b>		<b>100%</b>	<b>10000</b>	<b>3026</b>	<b>7</b>	<b>56</b>	<b>95</b>	<b>140</b>	<b>127</b>	<b>240</b>	<b>334</b>	<b>543</b>	<b>973</b>	<b>1082</b>	

## **Annexure P. - Electricity consumption data**

## Summary of data

Daily Meter Readings  
August + Part  
September 2002

Key:

period of WSSD  
activity

23.4 estimated data

Date	SSC MWh	Hilton	NASRE	
			UbuntuC	
01-Aug	36.83	25.5		
02-Aug	32.3	26.2		
03-Aug	31.41	24.5		3.9
04-Aug	17.82	24.3		3.6
05-Aug	39.05	24.8		4.0
06-Aug	29.27	25.1		4.7
07-Aug	33.84	24.8		4.8
08-Aug	19.6025	25.3		6.9
09-Aug	19.6025	23.9		6.8
10-Aug	19.6025	22.9		5.3
11-Aug	19.6025	21.2		6.4
12-Aug	20.16	21.5		7.3
13-Aug	17.7	23.7		9.5
14-Aug	20.15	24.5		10.3
15-Aug	40.32	24.3		11.6
16-Aug	21.29	26.1	9.1	12.0
17-Aug	18.94	26.2	10.8	12.4
18-Aug	20.28	27.1	14.2	14.3
19-Aug	27.36	25.8	15.1	16.4
20-Aug	21.62	26.5	15.1	17.7
21-Aug	24.5	25.4	15.3	18.4
22-Aug	24.91	24.7	12.2	14.4
23-Aug	29.79	25.7	15.8	18.7
24-Aug	31.91	26.1	16.5	19.6
25-Aug	34.82	24.0	16.1	19.5
26-Aug	40.88	24.9	16.5	21.0
27-Aug	44.63	25.3	16.7	23.6
28-Aug	37.52	25.3	16.4	23.1
29-Aug	43.11	25.4	16.4	22.8
30-Aug	45.24	26.4	16.5	23.4
31-Aug	40.39	28.8	16.9	23.4
01-Sep	42.46	24.7	16.8	20.3
02-Sep	48.6	25.5	16.4	20.6
03-Sep	43.27	25.9	15.9	21.7
04-Sep	43.85	25.2	16.2	21.0
05-Sep		24.0	16.4	19.1
06-Sep	24.5	24.5	15.7	
07-Sep	23.5	23.5	14.9	
08-Sep	21.4	21.4	13.8	
<b>Total</b>	1152.0	970.9	365.4	488.5MWh
<b>Average</b>	30.3	24.9	15.2	14.4MWh
<b>Maximum</b>	48.6	28.8	16.9	23.6MWh
<b>Minimum</b>	17.7	21.2	9.1	3.6MWh

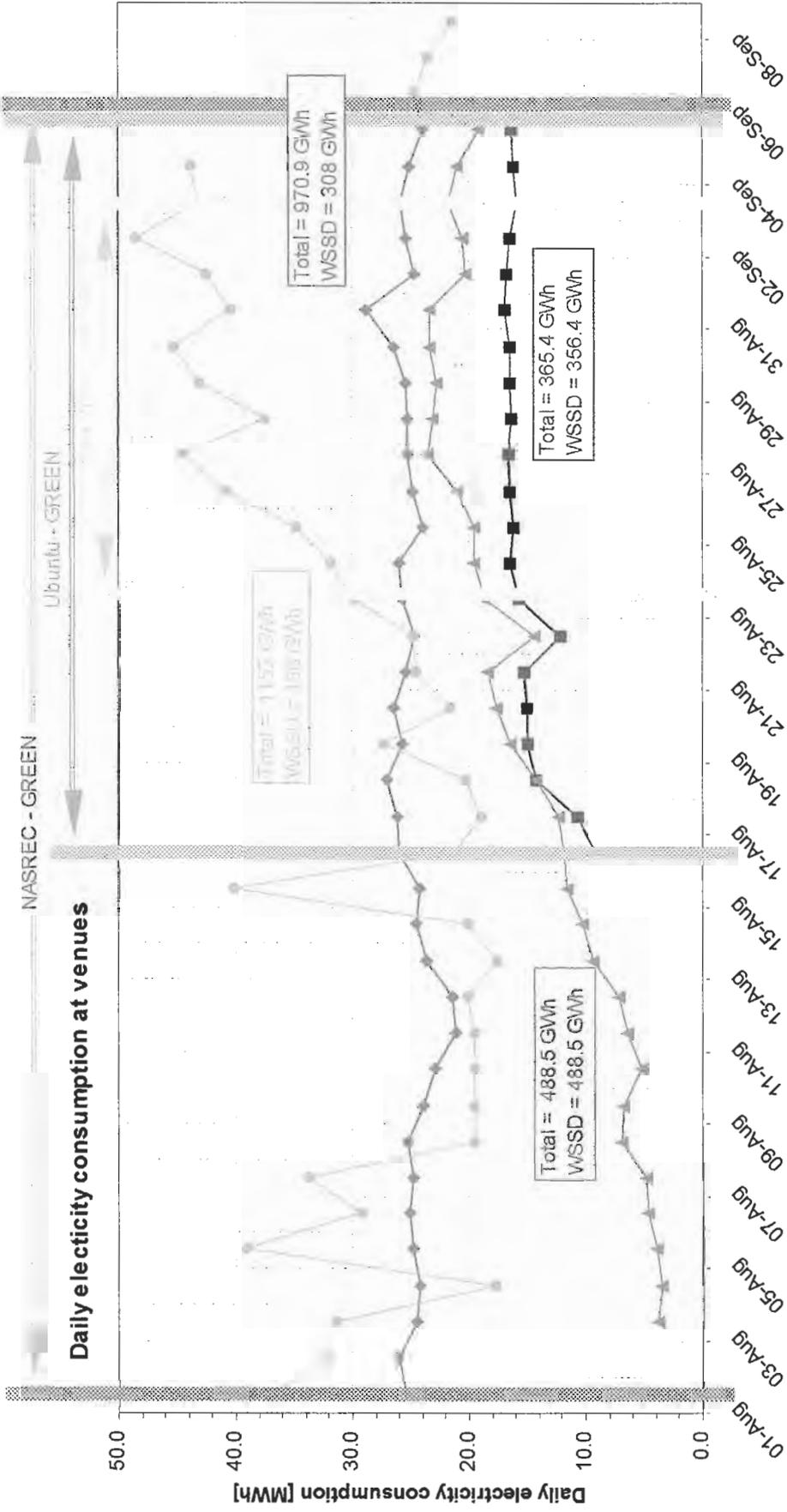
<b>WSSD</b>	496.68	307.5	356.4	488.5MWh
-------------	--------	-------	-------	----------

<b>Cost</b>			R	R
			178,180	244,240

<b>Non-green</b>	804.2MWh
------------------	----------

<b>Green</b>	844.8MWh
--------------	----------

<b>% green</b>	51.2%
----------------	-------



NASREC - GREEN

Ubuntu - GREEN

Daily electricity consumption at venues

50.0

Daily electricity consumption [MWh]

40.0

30.0

20.0

10.0

0.0

08-Sep

06-Sep

04-Sep

02-Sep

31-Aug

29-Aug

27-Aug

25-Aug

23-Aug

21-Aug

19-Aug

17-Aug

15-Aug

13-Aug

11-Aug

09-Aug

07-Aug

05-Aug

03-Aug

01-Aug

Date [dd-mmm]

Hilton Hotel

Ubuntu Village

NASREC

Sandton Convention Centre

## **Annexure Q. - Project Inception and planning report**

# PROJECT INCEPTION AND PLANNING REPORT

## Grant agreement 0046-0402-G-GA14

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**Report No.:** 034/1

**Date:** 15 May 2002



**Prepared by:** Glynn Morris  
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## **1. Project Meetings**

Since the grant award on 26<sup>th</sup> April 2002, three project team meetings have been held to plan the implementation of the project.

Project team meetings are held every Monday at 2.00pm at AGAMA Energy's offices at Westlake Square. These meetings are minuted and the minutes are distributed to the team members within 3 days.

## **2. Task allocation**

The allocation of tasks has been discussed at project meetings and the project leader, Glynn Morris, has had individual meetings with each team member to determine and clarify each team member's role. Ramboll's involvement has been confirmed primarily by email due to the fact that they are based in Denmark.

Overall responsibility for each task has been allocated to an individual team member.

The finalised task allocation is attached as Annexure 1.

## **3. Liaison with key stakeholders**

Glynn Morris and other team members have been liaising with the project stakeholders. A list of stakeholders is attached as Annexure 2.

## **4. Performance of tasks**

### **4.1 Task 1 – Administration**

The finalisation of the financial review undertaken by MEGA-TECH is nearing conclusion. Most of the required documentation has been supplied and outstanding documentation (i.e. audit of financial statements and finalised subcontracts for project team members) is being arranged.

The subcontracts for most project team members have been finalised and signed due to the fact that their tasks and roles have been clarified.

### **4.2 Task 2 – Determine the energy service needs of WSSD venues**

Glynn Morris has liaised with the management of the WSSD venues to deal with this subject. BONESA has been approached and are also keen to do an energy audit of the Sandton Convention Centre.

### **4.3 Task 3 – Source green electricity**

Ramboll, AGAMA Energy and Green Light Solutions have been liaising with Eskom regarding their inventory of small hydro capacity, and IPPs in South Africa, Lesotho and Swaziland. All viable green electricity producers have been added to the green electricity inventory.

### **4.4 Task 4 – Establish access to SAPP and wheeling mechanism**

Green Light Solutions has carried out a study of existing certificate-based green electricity trading systems in countries such as U.S.A, Australia, U.K. and Germany and is formulating a model which will be applied in South Africa to achieve the grant objective.

This will alleviate the need for wheeling mechanisms.

#### **4.5 Task 5 – Establish access to the distribution framework**

Underway

#### **4.6 Task 6 – Design a green electricity tariff**

A meeting with the National Electricity Regulator (NER) has established the basis for the green electricity tariff.

#### **4.7 Task 7 – Engage with the CDM**

Plans have been formulated for a conference on Green Power, with the emphasis on:

- a) creating an effective programme for the implementation of 2000Mw of new green capacity and
- b) highlighting the opportunities in RE for investors and entrepreneurs.

One World Sustainable Investments has approached several organisations to raise contributions to the green electricity premium. There is interest from some large organisations but a final commitment has not materialised yet.

#### **4.8 Task 8 – Monitoring and evaluation**

GEO has established contact with JOWSCO and Common Ground Consulting for the identification of indicators and co-ordination of the measurement and presentation of these.

#### **4.9 Task 9- Project documentation**

The documentation requirements for the first round of deliverables has been completed i.e. the Communication Strategy document, a briefing document, the list of key stakeholders and this report. The first comprehensive press release has been distributed.

#### **4.10 Task 10 – Public Awareness Campaign**

Galeforce Communication has been formally appointed to the project team and the public awareness/media plan has been formulated. This document will continue to expand and develop as team members add to the database on an ongoing basis.

The first briefing document has been widely distributed. Several articles have been arranged with appropriate publications.

Glynn Morris has addressed a press conference hosted by SECCP (Sustainable Energy & Climate Change Partnership) entitled “WSSD Press Briefing on Energy Issues & Launch of the SA Energy Sustainability Indicators Report” on 15<sup>th</sup> May 2002. A comprehensive press release was distributed to the media attending the event.

A list of potential patrons has been developed.

### **5. Conclusions**

The project is formally established now and the resource allocations have been confirmed.

The emphasis is now directed towards delivery against the programme whilst remaining flexible and responsive to developments.

\\Glynn\agama\Projects\034. Green Power for WSSD\Task 9 - Project documentation\project inception and planning report.doc

## **Annexure R. - Monthly progress report no.2**

# PROJECT PROGRESS REPORT

## Grant agreement 0046-0402-G-GA14

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**Report No.:** 034/2

**Date:** 20 June 2002



**Prepared by:** Glynn Morris and Mark Harris

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## 1. Project Meetings

The project meetings are continue to be held on Mondays at 14:00 on a weekly basis. Minutes are kept and used for management.

## 2. Liaison with key stakeholders

Glynn Morris and other team members have been liaising with the project stakeholders. A list of stakeholders was attached to the previous report. The main stakeholders include Eskom, National Electricity Regulator, CityPower, JOWSCO, the main venue management and the IUCN Greening the Summit initiative.

## 3. Performance of tasks

### 3.1 Task 1 – Administration

All meetings are minuted. Deadlines for some of the 31 May deliverables i.e. letters of intent for 3 project plans and the signing up of patrons were moved to 30 June, as approved by MegaTech.

### 3.2 Task 2 – Determine the energy service needs of WSSD venues

#### Letters of commitment from main venues.

Glynn Morris and Catherine Fedorsky have had further meetings with the respective management representatives who are all supportive of the Project.

**Sandton Convention Centre** (the main UN venue) – They have provided a signed letter of commitment. (a copy is attached hereto)

**Expocentre** (formerly Nasrec) –They have the draft letter of commitment but have not had confirmation from JOWSCO (at this late stage) for the contract for the Civil Society's Convention to be held there during the Summit. Expocentre management is currently in discussion with JOWSCO and have advised us that they will sign the letter of commitment as soon as they have confirmation regarding the use of the venue.

**Sandton Hilton** – The new manager supports the project, has assisted our team with the audits and access to metering facilities. He has undertaken to sign the letter of commitment once he returns to Johannesburg from Durban next week, 5<sup>th</sup> July 2002.

**Ubuntu Village** - Mark Harris met with Jameson Hlongwane, the JOWSCO person responsible for the venue, who will sign the letter of commitment provided that Citypower (who are the direct suppliers of power to that venue) have confirmed that arrangements have been made with them for the supply of green electricity. Citypower have now confirmed their involvement and commitment so the letter of commitment from JOWSCO is expected next week. Mr Hlongwane has confirmed that the letter will be signed within the next week, by 5<sup>th</sup> July 2002.

#### Audit reports for the main venues:

An energy audit specialist, Mr Chris Purcell of Energy & Development Group, has been added to the project team and is in the process of completing the venue audits.

**Sandton Convention Centre** –Have provided all billing and consumption details. A draft audit report has been prepared. The report needs to be reviewed by the SSC and will be finalised by 28 June.

**Expocentre** – The audit was due to be finalised on 14 June. However Expocentre management were having a meeting with JOWSCO on 14<sup>th</sup> so the audit was postponed to

19 June. Mr Purcell has provided a draft audit report and will be providing the final detailed audit report by 28<sup>th</sup> June 2002.

**Sandton Hilton** – The audit was completed on 13<sup>th</sup> June. However we are awaiting further information from the manager. The final report will be finalised by 28<sup>th</sup> June 2002.

**Ubuntu Village** – The venue is still under construction. However the information provided by JOWSCO and Citypower have enabled the team to estimate the requirements. The maximum demand has been determined as 2MVA and the electricity consumption is estimated to be less than 0.7 GWh.

#### **Maximum demand**

The maximum energy requirements for the venues has been determined to be less than 30 MVA – probably as low as 10 – 12 MVA - with estimated consumption to be not more than 10GWh of electricity – probably in the region of 3.5 – 5 GWh in total. These estimates will be confirmed as more information becomes available.

### **3.3 Task 3 – Source green electricity**

#### **Inventory of green capacity**

An updated inventory of green electricity has been prepared. To cover all bases, the project team has also had discussions with offshore green electricity producers (including Australia and Costa Rica) involving the possible sale of green electricity to the venues, based on tradable green electricity certificates. There is 24 MW available from a wind farm in Costa Rica. Ms. Catherine Fedorsky of GEO cc has been dealing with the Southern African Power Pool to confirm the capacity available during the Summit.

#### **NER certification criteria for licensing green generators**

The criteria have been drafted and another meeting with the NER to finalise these was held Thursday 20<sup>th</sup> June. Glynn Morris and Charles Dingley met with senior officials and the advisors to the CEO. (A briefing document is attached). The NER officials are in favour of the project and will present the project team's submissions to the next NER board meeting on Friday 28<sup>th</sup> June. Glynn Morris also had a separate meeting with a senior member of the board to brief him on the project.

#### **Signed supply agreements with green generators**

In the relatively short space of time available, it has not been possible to finalise supply agreements. The project team has been identifying and approaching green electricity generators and devising a system whereby the green electricity can be sold, transmitted and purchased. There is no existing system for trading in green electricity in South Africa. An interim system (incorporating green electricity tariff structures) is being discussed with all stakeholders and only when that has been finalised, will the green power generators be in a position to sign supply agreements. We can therefore only commit to obtaining signed supply agreements by 31 July. **We accordingly request that this deliverable be shifted from 31 May to 31 July.**

However, on 20<sup>th</sup> June, Glynn Morris and Charles Dingley met with Eskom who have undertaken to make certain green energy generation plants available for the project (including the 25 kW Stirling Engine at DBSA). This is a positive step because the project team had experienced some initial reluctance from Eskom in May.

### **3.4 Task 4 – Establish access to SAPP and wheeling mechanism**

The project teams' discussion document on the introduction of a green electricity certificate solution has been circulated to appropriate stakeholders such as NER, DME, Eskom and at least another 20 important players in the South African electricity industry and abroad. A copy of the discussion document is attached hereto. Dozens of responses have been received from experts in SA and several other countries. Charles Dingley is in the process of integrating the feedback into a final document.

## **Task 5 – Establish access to the distribution framework**

Ongoing discussions with Eskom transmission.

### **3.5 Task 6 – Design a green electricity tariff**

The finalisation of a green tariff is part and parcel of the discussion document on green electricity. Discussions with stakeholders, and the NER in particular, are continuing. It should be noted that the NER are very supportive of this project and are interested in finalising the issue.

### **3.6 Task 7 – Engage with the CDM**

Plans have been formulated for a conference on Green Power, with the emphasis on:

- a) creating an effective programme for the implementation of 2000 MW of new green capacity and;
- b) highlighting the opportunities in RE for investors and entrepreneurs.

The conference plan is attached hereto.

One World Sustainable Investments has approached several organisations to raise contributions to the green electricity premium. There is interest from some large organisations but a final commitment has not materialised yet.

### **3.7 Task 8 – Monitoring and evaluation**

GEO has established contact with JOWSCO and Common Ground Consulting for the identification of indicators and co-ordination of the measurement and presentation of these. Furthermore, the venues have provide confirmation of metering facilities as follows:

**Hilton** – access to digital metering facilities

**Expocentre** –there is access to the current analogue meters but Citypower have undertaken to install digital metering before the Summit.

**Ubuntu Village** – Citypower will be installing four substations and will provide the project team with digital metering information

**Sandton Convention Centre** – have undertaken to provide the project team with consumption statistics at 0700 and 2200 every day.

As a result of digital metering facilities, the project team will have access to all the required information via the internet and will therefore not require regular access to the venues.

### **3.8 Task 9- Project documentation**

Records of all financial transactions are being kept. GEO is formulating a template for proper scientific evaluation of the data gathered at the Summit. Progress information is being collated on an ongoing basis to facilitate the drafting of the final project report.

### **3.9 Task 10 – Public Awareness Campaign**

#### **Print media**

Three articles have been published in the Cape Argus and Business Day. A letter from Glynn Morris dealing with the green electricity costs was published in Business Day this week, 21<sup>st</sup> June 2002.

Articles have been submitted to several magazines to meet their deadlines for publication in August and September. ESI Africa magazine (the power journal of Africa) have requested and been sent an article on the project. The magazine is now on the shelves. Acumen magazine have interviewed the project team for an article in their next edition. Urban Green File and Odyssey magazine will also be publishing articles on the project.

An advert appeared in Business Day calling for green electricity suppliers. A similar advert is in the latest edition of ESI Africa.

**Radio**

Radio slots have been arranged with SAFM, (Women Today and Ecowatch) and are likely to be scheduled within the next month.

**TV**

Proposals have been sent to Carte Blanche and to SABC1 and Summit TV for interviews and features.

**Patrons**

Thirty possible patrons for the project have been approached. Four have accepted and several have expressed interest. Some have declined due to the fact that it is a voluntary position and they will not be paid for lending their names to the project. However, all parties approached have been provided with briefing documents giving information on the project and green power in general.

**General**

Members of the project team participated in the Western Cape's schools fair on World Environment Day in Malmesbury on 5<sup>th</sup> June, providing talks to groups of schoolchildren on the relevance of renewable energy and the significance of the WSSD.

A new comprehensive briefing document has been prepared for widespread email distribution among the Southern African and global energy community to raise awareness of the project.

## 4. Conclusions

This project is very significant in that it is pioneering a completely new approach to the generation, sale and purchase of electricity in South Africa. Although it constitutes a departure from the current system, it is directly in line with the government's new policies. This is apparent from the Department for Minerals and Energy's call for proposals for the restructuring of the Electricity Supply Industry (ESI), on 15<sup>th</sup> June 2002.

The major challenge is the need to design a new system, obtain the consent and support of the authorities and implement the system in the space of four to five months. Due to the time constraints, the final dates for achievement of monthly deliverables have been extended by a few weeks in some cases. These extensions have been unavoidable due mainly to the reliance on responses from other parties such as Eskom, NER, venue management and green electricity generators.

The project team has met with some uncertainty but also with a great deal of enthusiasm from different sectors of the ESI. The main challenge and constraint is the short space of time. However, the grant objectives will be met and the project is already proving to be a catalyst for fast tracking change towards renewables in the ESI.

## **Annexure S. - Monthly progress report no.3**

# PROJECT PROGRESS REPORT

## Grant agreement 0046-0402-G-GA14

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**Report No.:** 034/3

**Date:** 15 July 2002



**Prepared by:** Glynn Morris and Mark Harris

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## 1. Project Meetings

The project meetings are continue to be held on Mondays at 14:00 on a weekly basis. Minutes are kept and used for management.

## 2. Performance of tasks

### 2.1 Task 1 – Administration

Project administration is ongoing. Mark Harris is managing this.

Increasingly, the project is engaging with the other stakeholders on a logistical basis.

Glynn Morris met with Claudia Holgate, Project co-ordinator for the Greening the Summit Project on Tuesday 2<sup>nd</sup> July 2002.

On 4<sup>th</sup> July 2002, Glynn Morris and Davin Chown met with Mr Steve Lennon, Executive Director of Strategy and Research, and Ms Vanida Govender, Corporate Environmental Affairs Manager, for Eskom at the site of the new Eskom demonstration wind farm at Klipheuwel, near Cape Town.

Glynn Morris and Belynda Hoffman attended a breakfast briefing by the Chairman of Eskom, Mr Reuel Khoza on Thursday 11<sup>th</sup> of July 2002 and subsequently met with him, with Gial Jennings to appraise him on progress on the project.

Glynn Morris and Gail Jennings attended a technical co-ordination meeting on Thursday 11<sup>th</sup> July 2002 at JOWSCO offices.

### 2.2 Task 2 – Determine the energy service needs of WSSD venues

#### Letters of commitment from main venues.

Letters have been provided by the Sandton Convention Centre (the main UN venue) and Expocentre (formerly Nasrec). The management of Sandton Hilton supports the project and JOWSCO have committed the Ubuntu Village to the project – we are waiting for a letter from JOWSCO.

Eskom has now declined to participate in the project. Consequently, the Sandton Convention Centre or the Sandton Hilton will be invited to participate in the project independently of Eskom – for the electricity monitoring and perhaps by purchasing green electricity certificates directly.

#### Audit reports for the main venues:

An energy audit specialist, Mr Chris Purcell of Energy & Development Group, has completed audit reports for Sandton Convention Centre, Expocentre and The Sandton Hilton.

In the case of the Ubuntu Village, the maximum demand has been determined as 2MVA and the electricity consumption is estimated to be less than 0.7 GWh over the three week period of the WSSD.

### 2.3 Task 3 – Source green electricity

#### Inventory of green capacity

An updated inventory of green electricity has been prepared. Glynn Morris has been engaging with Bill Balet of the Southern African Power Pool to update the inventory. Negotiations are underway for the implementation of new capacity at the Greenhouse

Project in Joubert Park. Tongaat Hulett are quantifying the capacity capacity available during the Summit from their four sugar mills. Similarly, other suppliers such as Friedenheim Hydro in Mpumalanga and Ceres Hydro are assessing their capacity.

An advertisement has been placed in one of the main trade journals in Africa called ESI Africa (attached as Appendix A – Advertisement for Green Power in ESI Africa).

#### **NER certification criteria for licensing green generators**

The Criteria for Certification of Green Power Producers has been submitted to the National Electricity Regulator (NER) and other stakeholders for comment and feedback (attached as Appendix C – Discussion document on the criteria for certification of green power producers).

The Board of the (NER) endorsed the project and its aims at the board meeting on Friday 28<sup>th</sup> June and offered their support in completing the project successfully. An appropriate press release/article has been prepared, approved by the NER and sent to the media (Attached as Appendix B – Article in Engineering News online 18/07/2002). The article will also appear in the NER's quarterly journal, The Electricity Regulatory Journal.

#### **Signed supply agreements with green generators**

This deliverable has been shifted from 31 May to 31 July.

### **Task 4 – Establish access to SAPP and wheeling mechanism**

Charles Dingley has integrated feedback into the discussion document on the introduction of a green electricity certificate solution which has now been elevated to the status of a draft framework document.

### **Task 5 – Establish access to the distribution framework**

The NER has assured access to the national grid in terms of their mandate and obligations in terms of the act of parliament which elaborates their role. This has been confirmed by the NER Board decision to endorse the project.

### **2.4 Task 6 – Design a green electricity tariff**

A discussion document on a proposed green electricity tariff has been drafted and circulated for comment (attached as Appendix D – Discussion document on the proposed green electricity tariff). The NER has approved the tariff in principle and City Power have endorsed it. City Power will forward a letter to the NER to obtain approval to use the tariff for their clients for WSSD.

### **2.5 Task 8 – Monitoring and evaluation**

As mentioned in the previous report, adequate preparations for monitoring and evaluation have been put into place.

Catherine Fedorsky has been liaising with Errol Cerff who is compiling the Environmental Barometer for the Greening of the Summit Project.

### **2.6 Task 10 – Public Awareness Campaign**

#### **Print media**

ESI Africa published a small news brief on the project in the latest issue, Issue 2, 2002 (copy enclosed – see page 6).

#### **Radio**

Glynn Morris, was interviewed by John Richards, SAFM Summit Update, Friday 12 July, repeat programme Sunday 14 July. Listenership 515 000.

Glynn Morris, interviewed by Bush Radio, Friday 12 July 1.30 pm Listenership 7 000.

Glynn Morris, interviewed by Radio CCFM, Wednesday 17 July 5.30pm Listenership 201 000 (combined audience with Radio Tygerberg)..

**TV**

Awaiting feedback on proposals to M Net, SABC1 and Summit TV for interviews and features.

**Online e-news**

The project was featured in the RE Focus electronic newsletter (attached in Appendix G – article in RE Focus Weekly)

**Patrons**

Thirty possible patrons for the project have been approached. Three have accepted and several have expressed interest. The patrons which have accepted to date are:

- Andrew Kelehe (SAPS runner from Mafeking, Comrades Winner 2001)
- Roda Khodali (prominent SA public figure and civil society activist)
- Annita Roddick (international businesswoman, CEO of The Body Shop, global activist)

A list of potential patrons is attached as Appendix E – List of patrons

### 3. Conclusions

The project has elicited significant interest and comment.

The overall objective of the project was to develop a regulatory and trading framework for the development of a green power market in South Africa (as a stimulus for investment in new renewable energy generation capacity as per the DME's policy) and, furthermore, to test the effectiveness of this regulatory and trading regime with the practical example of supplying green power into the main venues of the WSSD.

The fundamental issues have been clarified and established and what remains now is to implement the 'case study' in manner which meets the expectations of the WSSD stakeholders and also the long term players in the southern African ESI.

## Appendix A – Advertisement for Green Power in ESI Africa

**CALLS FOR THE SUPPLY OF GREEN ELECTRICITY INTO A PILOT GREEN POWER MARKET**

*green energy solutions for Africa*

**AGAMA**  
energy

contact GIVNN MORRIS

00253 701 7057 • givnn@agama.co.za • www.agama.co.za

**AGAMA Energy is soliciting the supply of Green Electricity to the four main venues of the World Summit for Sustainable Development for the duration of its activities. This is a GEAT project, which is funded by USAID. Suppliers of Green Electricity - at any scale - in the SADC region or internationally, are invited to contact us.**

**Criteria for selection include:**

- Renewable Energy Sources
- Sustainable Green Technology / Processes

## Appendix B – Article in Engineering News online 18/07/2002

### Green energy plan for Joburg summit

A Cape Town-based green energy service company will be facilitating a pilot project under the auspices of the Department of Environmental Affairs and Tourism to supply green electricity to two of the venues – the Ubuntu Village and the Expo Centre – at next month's World Summit on Sustainable Development (WSSD) in Johannesburg.

### Green energy plan for Joburg summit

A Cape Town-based green energy service company will be facilitating a pilot project under the auspices of the Department of Environmental Affairs and Tourism to supply green electricity to two of the venues – the Ubuntu Village and the Expo Centre – at next month's World Summit on Sustainable Development (WSSD) in Johannesburg.

Agama MD Glynn Morris tells Engineering News Online that the company plans to bring green electricity through Cape electricity supplier CityPower to the Expo Centre by the end of the month.

“Initially, we wanted to source wind energy from Darlipp, the new 5,2 MW windfarm in Darling, in the Western Cape, but since it won't be ready in time, we have to find alternative sources,” he explains.

“To date, we have not secured any formal commitments, but we hope to source a combination of wind, solar, hydro and biomass energy from local, Southern African Development Community and international suppliers”.

Local suppliers could include the likes of Eskom, which owns and operates a number of hydro plants in the Eastern Cape, as well as various other independent power producers in Kwazulu-Natal and Mpumalanga.

“We expect to have final confirmation on the suppliers within the next two weeks,” Morris said.

It is believed that this pilot project, which is funded by the US Agency for International Development, will give South African industries and electricity customers the opportunity to learn about the concept of green power and its potential for cleaner exports.

“Unlike conventional coal or nuclear-derived electricity, green electricity is not only derived from renewable energy sources, but it is generated as a sustainable process,” Morris notes.

The current form of energy, which relies on the extraction of fossilised energy (such as coal) or mineral resources (in the case of uranium) for the conversion into electrical energy, is unsustainable since these resources are finite and will ultimately be exhausted.

Green electricity, on the other hand, can be generated by anyone with access to sufficient renewable resources and the technical and financial capacity to implement an engineering project.

At present, there is reportedly more than 50 MW of green electricity available in the Southern African power pool – enough to fulfill the energy needs of 20 000 households.

“With lower transmission cost, greater reliability and reduced environmental impact, renewable electricity generation close to demand makes good sense,” Morris maintains.

However, to date, there is not yet a mechanism for trading green electricity in South Africa.

But efforts are being made by the National Electricity Regulator (NER) to move forward in this regard.

Last month, the NER board took a decision to support the concept of green electricity, and in particular the pilot project headed by Agama.

The NER, which, in terms of the Electricity Act, regulates the supply, generation, distribution and transmission of electricity in South Africa, has, with Agama, developed a regulatory and trading framework for the pilot project with the view to stimulate investment in new green electricity generation capacity.

A likely mechanism, which could be implemented for trading in green electricity in the future is green certificates.

Essentially, a green power producer (certified and monitored by the NER) would have to acquire a green power certificate for any green power supplied onto the national grid.

Any distributor or supplier (also licenced by the NER) that wishes to offer a green electricity product would then be able to buy the green power certificates to back up the sales to customers.

It is envisioned that green electricity sales will be regulated within a green electricity tariff structure to be established and regulated by the NER.

“The WSSD pilot project will be a crucial first step towards deregulating and privatising the electricity supply industry (ESI) and increasing the proportion of renewable energy to the energy mix,” NER GM Dr Wolsey Barnard said in a press statement.

Locally, the South African ESI is in the process of being restructured, with a draft White Paper on Renewable Energy and Clean Energy Development stipulating up to a 5% increase in green electricity by 2012.

At present, South Africa contributes between 4% and 5% of the world’s carbon emissions, the fifteenth highest offender internationally.

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Zonika Botha, Online Writer - email: [newsdesk@engineeringnews.co.za](mailto:newsdesk@engineeringnews.co.za).

## **Appendix C – Discussion document on the criteria for certification of green power producers**



## **Appendix D – Discussion document on the proposed green electricity tariff**

## **Appendix E – List of patrons**

**Appendix F – Radio competition**

## Appendix G – article in RE Focus Weekly

-----Original Message-----

**From:** Refocus [mailto:re-focus-e2-1855@processrequest.com]

**Sent:** 03 July 2002 17:34

**To:** glynn@agama.co.za

**Subject:** Refocus Weekly - renewables update - Issue 2

### REFOCUS WEEKLY

Issue 2 - Refocus Weekly, from Refocus - the international renewable energy magazine.

Please feel free to forward this email to any colleagues you believe would benefit from this service. Please send your comments and feedback to [re-focus@elsevier.com](mailto:re-focus@elsevier.com)

If you have received this from a colleague and would like to receive your own personal copy every week, please [click here](#) and register for free.

This weeks' headlines:

- [Europe Needs Common Energy Policy and Diversification of Supply](#)
- [Environmental Group Urges Single Standard for Renewables in Europe](#)
- [UN Agency Wants Environmental Program Replenished](#)
- [Johannesburg Summit to Consume Green Power](#)
- [Britain Provides £1.7 Million for Renewable Energies at the Local Level](#)
- [Plans Announced for Largest Windfarm in Eastern United States](#)
- [Tokyo Electric Power Company Intends to Invest in Tomen Power Holdings](#)
- [Denmark's Wind Industry Sets New Records in 2001](#)
- [Solar PV Creates More Jobs Than Wind, says Analysis](#)
- [US Research Centre to Install Photovoltaic System](#)
- [New U.S. PV Facility Can Produce 30 MW of Solar Cells](#)
- [News-in-Brief](#)

Further details of all these stories are below. For further news stories and features, events, useful links and other resources please visit <http://www.re-focus.net>.

\\Mark\agama\Projects\034.Green Power for WSSD\Task 9 - Project documentation\Monthly progress reportno. 3 30 June.doc

## **Annexure T. - Monthly progress report no.4**

# GREEN POWER FOR THE WSSD

## PROJECT PROGRESS REPORT

Grant agreement 0046-0402-G-GA14

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**Report No.:** 034/4

**Date:** 30 August 2002



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## **1. Project Meetings**

Weekly project meetings were held until 5<sup>th</sup> August 2002. Since mid August, the project team has been communicating by email due to the fact that most of the team members have been attending the Summit. The monitoring and metering team have been meeting on a daily basis at the Ubuntu Village.

## **2. Performance of tasks**

### **2.1 Task 1 – Administration**

#### **2.1.1 Amendments to the contract**

The contract has been amended to accommodate the extra amount allowed for some WSSD activities.

The radio competition which had been planned has been omitted to reduce the project budget.

### **2.2 Task 2 – Determine the energy service needs of WSSD venues**

#### **2.2.1 Letters of commitment from main venues.**

Completed

#### **2.2.2 Audit reports for the main venues:**

The audit reports have been circulated to the venue managers for comments and corrections. These reports have been formatted and converted into .pdf files for reference and distribution at the discretion of the venue managers.

### **2.3 Task 3 – Source green electricity**

#### **2.3.1 Inventory of green capacity**

The inventory of green electricity generation capacity has been updated and is attached hereto.

#### **2.3.2 Signed supply agreements with green generators**

Completed application forms for registration as green electricity suppliers have been submitted by the suppliers to the NER. The NER has evaluated the applications and registered the listed suppliers for the purposes of the project (refer to Appendix B – Letter of registration of Green Power Producers). Further applications are still being processed.

### **2.4 Tasks 4 – 5 – Certification and Trading Mechanism**

Charles Dingley has integrated all further feedback into the draft framework document on the green electricity certificate solution. On their stand at the Ubuntu Village, the NER refer to the fact that, together with AGAMA Energy, a regulatory and trading framework has been developed.

The NER has assured access to the national grid in terms of their mandate and obligations in terms of the act of parliament which elaborates their role. This has been confirmed by the NER Board decision to endorse the project.

### **2.5 Task 6 – Design of a green electricity tariff**

The project document laying out the proposed new green electricity tariff has been endorsed by the NER. (Refer to 2.4 above).

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The NER has approved a green electricity tariff for City Power (Refer to Appendix C – Letter of registration of Green Electricity Tariff).

## **2.6 Task 7 – Engaging with the CDM**

### **2.6.1 Investment conference**

The plan for the investment conference has been discussed with potential stakeholders including the Minister of Minerals and Energy, Phumzile Mlambo-Ngcuka.

### **2.6.2 Obtaining commitment for three project plans**

The One World Sustainable Investments team has been constantly identifying projects with investment potential and approaching a variety of investors in U.K., Europe and South Africa. The following three projects have been singled out for the purposes of this project task because the business plans have reached an advanced stage of development and finance has been committed by outside investors:

#### **Makhatini Flats Biofuel Project**

Located in the northern part of KwaZulu-Natal Province, there are two elements to the project both stemming from biomass: bio-diesel and bio-ethanol.

#### **La Motte Energy Company**

Involving the La Motte Community Trust and an empowerment company in Franschoek, Western Cape Province. This combines small-scale hydro with wind and there is a related project to utilise biomass for electricity generation. The company is in the process of being structured and registered.

#### **Kouga Energy Company**

This consists primarily of a 10MW wind farm located near Port Elizabeth in the Eastern Cape. A letter of intent from Eskom to accept the output into the grid, has been signed and financing has been committed by a wind energy company from the EU.

Negotiations for funding/investment for the above tasks have reaped positive commitments from financing sources who have committed themselves. However, due to the complicated and sensitive nature of financing business ventures, it has not been possible to obtain specific letters of commitment for the purposes of the project.

## **2.7 Task 8 – Monitoring and evaluation**

Final preparations have been made to ensure that electricity consumption data is collected and analysed on a daily basis. Catherine Fedorsky will ensure that the data and the analysis thereof will be given to the IUCN Greening the Summit committee by 10:30 am each day for inclusion on the “Consumption Barometer” which will be displayed at “Greening the Summit” kiosks and web site. The consumption to date has averaged 50 MWh per day which is well within the capacity of the registered suppliers. An example of the electricity consumption pattern is included in Appendix D – Electricity consumption barometer

## **2.8 Task 9 – Documentation**

In addition to the minutes of the weekly project meetings, four progress reports have been compiled to document the project.

These documents will all be used to compile the final project report in November 2002.

## **2.9 Task 10 – Public Awareness Campaign**

### **2.9.1 Print media**

An advertisement for the project has been placed in, one of the official WSSD publications – The SA Development Handbook. Copies will be given to approximately 50% of the delegates. Articles have appeared in most of the relevant publications. A full list of these will be submitted with the final project report.

### **2.9.2 Radio**

Glynn Morris, was interviewed by John Richards, SAFM Summit Update, Friday 12 July, repeat programme Sunday 14 July. Listenership 515 000.

Glynn Morris, interviewed by Bush Radio, Friday 12 July 1.30 pm Listenership 7 000.

Glynn Morris, interviewed by Radio CCFM, Wednesday 17 July 5.30pm Listenership 201 000 (combined audience with Radio Tygerberg).

He has also done interviews with six additional community stations

### **2.9.3 TV**

Interview with Glynn Morris aired on Summit TV who have planned further broadcasts on the project. Two similar interviews were aired on eTV. Mark Harris was interviewed by SABC TV2 for a WSSD documentary and for 50/50, an environmental programme. The Moshoeshoe Eco-Village in Kimberley has received substantial TV coverage on SABC and eTV. The wind and solar systems installed by AGAMA Energy are providing green electricity for the project.

### **2.9.4 Patrons**

As mentioned in the last report, the patrons are:

- Andrew Kelehe (SAPS runner from Mafeking, Comrades Winner 2001)
- Roda Khodalie (prominent SA public figure and civil society activist)
- Annita Roddick (international businesswoman, CEO of The Body Shop, global activist)
- Tony Weaver (prominent SA-based journalist)

It has been our experience that most prominent people approached to be patrons are either too busy to accept or their agents require payment of substantial amounts. Due to the project team's decision that no payments to patrons would be made, it has become difficult to confirm any new patrons. Furthermore, due to the budget constraints resulting from currency fluctuations, the team has decided to spend constructive time engaging in other, more important aspects of the project. The exercise of approaching and briefing prospective patrons has already raised the consciousness of people about the project and we continue to send updates to them.

### **2.9.5 Conferences**

Glynn Morris addressed the LAMNET conference in Kwazulu Natal (hosted by the SA Sugar Association) on the project and on the opportunities for sugar producers to generate power and participate in a green electricity market.

He also presented a paper at a conference on Tradeable Renewable Energy Certificates at the WSSD. A programme is attached in Appendix E – Programme of the TRECKIN workshop and a copy of the presentation is attached in Appendix F – Presentation at the TRECKIN workshop.

### **2.9.6 Visibility at the WSSD**

DEAT had advised that the project would be showcased on the DEAT stand and we briefed them with details for posters on the project. On arrival at the SA Pavilion we were advised that they had shelved their plans due to lack of space. Consequently, we designed a new poster and flyers describing the project and displayed them on the AGAMA Energy stand.

The AGAMA Energy stand in the S A Pavilion has been primarily used to highlight the Green Power for WSSD project and we have engaged with a variety of influential people. Glynn Morris and Mark Harris have also on two occasions, discussed the implications with the Minister of Minerals and Energy.

## **Annexure I.5 Monthly progress report no.5**

## **Annexure U. - Monthly progress report no.5**

# PROJECT PROGRESS REPORT

## Grant agreement 0046-0402-G-GA14

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**Report No.:** 034/5.1

**Date:** 31 October 2002



**Prepared by:** Glynn Morris and Mark Harris

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## 1. Project Meetings

A summing up project meeting was held on 16 September to analyse data from the WSSD and identify the few remaining tasks to be completed.

## 2. Performance of tasks

### 2.1 Task 1 – Administration

Project administration is ongoing. Mark Harris is managing this.

### 2.2 Task 8 – Metered consumption of green electricity

#### Ubuntu Village and Nasrec

Mark Harris met with a CityPower technician on site on 14 August and arranged access to the electricity meters at Nasrec and Ubuntu Village. Thereafter, at 10.00 am each day, readings of daily consumption at those venues were taken and sent by SMS to a data collector who fed the figures into a predetermined format. A total of 854MWh was consumed by these venues during the course of the metering period.

The consumption figures were provided to the Greening the Summit project team who processed the figures and published a daily “green barometer “ on monitors at various WSSD venues. The displays on these monitors included information on the amount of greenhouse gas emissions reduced and the amount of water saved as a result of the supply of green electricity.

#### Sandton Convention centre and Sandton Hilton

Even though these two venues were not participating in the supply of green electricity (due to Eskom’s refusal to allow them to participate), daily consumption figures were submitted by staff at the two venues. This data was entered into the consumption metering programme.

A graph of the consumption of electricity at the WSSD venues is attached hereto.

### 2.3 Task 8 – metered production of green electricity

A schedule of green generators which have been licensed by National Electricity Regulator is attached hereto. This schedule can also be found on the NER website ([www.ner.org.za](http://www.ner.org.za)) under the heading “Public domain list of licensees”

The licensees all have metering facilities and are entitled to register Green Watts certificates for each megawatt hour that they produce. Sufficient certificates have been registered to adequately cover the consumption at the Ubuntu Village and Nasrec during the WSSD.

### 2.4 Task 3 – signed supply agreements with green generators

Once the green generators have been licensed, they register their output on-line on the NER website in the Green Watts Certificates section. This does away with the need for signed supply agreements. The deliverable requiring signed supply agreements is now superfluous but has, in fact, been satisfied by the fact that the green generators have been

licensed and have registered sufficient Green Watts certificates to adequately provide the power for the WSSD project.

## **Task 10 – Public Awareness Campaign**

### **Briefing document**

A further briefing document which was distributed to the public during the WSSD is attached hereto. This document is not available in an electronic format so it will be attached to the hard copy of this report.

### **Radio and Television project coverage**

#### Radio

SAFM, John Richards, SAFM, interview with Glynn Morris 12 July and 14 July 2002

Bush Radio, interview with Glynn Morris on 12 July 2002

Radio CCFM, interview with Glynn Morris on 17 July 2002

Radio Panorama, interview with Glynn Morris on 20 August 2002

ALIX FM, interview with Glynn Morris 15 August 2002

East Rand Stereo, interview with Glynn Morris 16 August

Rainbow FM, interview with Glynn Morris 15 August 2002

Radio Khwezi, interview with Glynn Morris 16 August 2002

Radio Zibonele, interview with Catherine Fedorsky, 19 August 2002

#### Television

Summit Television, interview with Glynn Morris, 1 August 2002

e.tv, interview with Glynn Morris, 13 August 2002

SABC 2, WSSD slot, interview with Mark Harris, 26 August 2002

50/50, interview with Mark Harris, 26 August 2002

WSSD 60-second insert, Mark Harris, 26 August 2002

### **Patrons**

Archbishop Desmond Tutu has contacted the project team and agreed to be a patron to the project.

## **3. Conclusions**

The project objectives have been attained and, in most cases, exceeded. As a result, the project can be seen to be a success and, in addition to the successful attainment of the project outputs, the outcomes will have a significant impact on the future of the energy sector in South Africa and the southern African region. A further observation is that the project team members provided input which far exceeded the time allocated in the project budget, through a genuine interest and dedication to the cause of alleviating negative climate change impacts on the world.

## **Annexure V. - Briefing Document 1**

# GREEN POWER FOR THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT

Briefing Document #1

11 April 2002

AGAMA Energy (Pty) Ltd

The World Summit on Sustainable Development takes place between 24<sup>th</sup> August – 4<sup>th</sup> September 2002 in Johannesburg, South Africa<sup>1</sup>. This important event, which is expected to be the largest United Nations convention ever, will enjoy enormous publicity. Green electricity has the potential to enhance the WSSD by mitigating greenhouse gas emissions associated with fossil fuel-fired electricity generation. The key reasons include:

- The main conference venues for the WSSD will need, and already require electricity;
- The current generation mix of the electricity supply in South Africa is derived primarily from fossil-fuel generation which has profoundly negative climate change implications;
- There is existing green electricity generation capacity in the Southern African Power Pool (SAPP) (including ESKOM) which has until now not been identified, or valued, as such; and
- New green generation capacity, within ESKOM, NamPower and from Independent Power Producers (IPP's), will come on stream shortly.

There is presently an extremely conducive environment in South Africa for fast-tracking green electricity services to the main WSSD venues. The benefits would be:

- Provision of a high quality and more sustainable service to the WSSD venues, and
- Demonstration of the potential for a more sustainable mix of supply options within the Electricity Supply Industry (ESI) in Southern Africa.

The tangible outputs of the supply would be;

- Webcam images displayed in the foyers of the main WSSD venues (and on all WSSD media) which show small hydro turbines or wind turbines or bagasse-fired steam plant operating elsewhere in the SADC region;
- A spinning electricity meter; and
- A certificate from the National Electricity Regulator (NER) to warrant that the power is in fact green.

ESKOM would play a key role in achieving this goal for the WSSD and South Africa. In so doing, ESKOM would derive great acknowledgement for their role in unlocking a new market paradigm for differentiated electricity services. This could in turn accelerate the investment in new green generation capacity.

AGAMA Energy, a green energy services company, is facilitating a project under the auspices of DEAT – and supported by USAID - for the supply of green electricity to the main venues of the WSSD for the duration of the Summit (and hopefully beyond the WSSD) and thereby assist in greening the WSSD. All the key stakeholders have committed themselves to the realisation of the above objective.

These include:

- JOWSCO
- DME
- NER
- CityPower

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<sup>1</sup> You will find more information on the WSSD at [www.joburgsummit.com](http://www.joburgsummit.com)

- Darlipp – a new 5.2 MW wind farm in Darling, Western Cape, which is hoped to be producing power by August 2002
- Sandton Convention Centre

The project budget includes a grant for the marginal costs to the WSSD venues for the premium of a green tariff.

The project team is lead by Glynn Morris, AGAMA Energy (Pty) Ltd and includes: Jørgen Boldt of RAMBØLL (Denmark), Catherine Fedorsky of GEO cc, Davin Chown of ONE WORLD and Louis de Lange of Genesis Eco-Energy.

**Contact:** Glynn Morris    email: [glynn@agama.co.za](mailto:glynn@agama.co.za);    tel: +27 21 780 9024  
cell: +21 83 780 9460

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## **Annexure W. - Briefing Document 2**

## **Green Power for the WSSD: A catalyst for new investment**

The World Summit on Sustainable Development (WSSD) is benefiting from an innovative pilot project – one that aims to establish the basis for a regulatory and trading framework for green electricity to consumers and industries in the southern African region and encourages investment in new green generation capacity as indicated in the government policy on energy.

The project, led by AGAMA Energy, a green energy services company in Cape Town, will co-ordinate the supply of electricity (certified 'green' by the National Electricity Regulator (NER) of South Africa) to two of the main venues at the Summit: the Ubuntu Village and NASREC Expo Centre.

Green electricity is produced from renewable energy sources, such as the sun, the wind, waves and small hydro stations, for example. In addition, it is not only derived from renewable energy sources, but is also generated in a sustainable and environmentally responsible way.

Green electricity will be certified as such by the National Electricity Regulator (NER), and will be supplied by new and existing power generators in the southern African region.

NASREC and the Ubuntu Village are both supplied electricity by City Power Johannesburg. City Power has committed itself to buying sufficient green electricity to cover all the power needs of the two venues (the bulk of the expected 65 000 delegates attending the WSSD will be meeting at these two venues).

Energy audits have been completed at these venues, to establish their electricity requirements and to identify opportunities for implementing energy efficiency or conservation measures.

The proposed regulatory and trading regime for this green electricity market, as developed with the NER, adopts an internationally established approach of Green Power Certificates (or tradeable renewable energy certificates).

This certificate approach ensures that any Green Electricity purchased has been generated by a certificated green power producer and delivered into the national grid. The green electricity customer is guaranteed that his or her consumption will be matched by the input of the same amount of kilowatt-hours from green sources into the national grid.

The Green Electricity will be sold in terms of a green electricity tariff, developed with City Power and the NER. The tariff has been calculated at 50 cents per kilowatt hour, to reflect the true costs of new green generation – this is approximately 100% more expensive than current prices.

Energy is one of the key issues to be discussed at the Summit. Increased use of green electricity will ultimately reduce greenhouse gas emissions and global warming, ease air pollution and save water -- contributing to the health and quality of life of all South and Southern Africans.

Crucially, a new green electricity market will contribute to the WSSD's commitment to poverty alleviation. This pilot project will set the stage for local and foreign investment in renewable energy, which will encourage job creation through the development of independent power production businesses.

The supply of renewable energy is more labour intensive than coal or nuclear electricity generation. Research shows, for example, that wind energy is about 10 times as labour intensive per energy unit as nuclear energy; and that wind-generated electricity is twice as labour-intensive as coal-fired power.

This pilot project is led by AGAMA Energy, assisted by GEOcc, Energy and Development Group, Charles Dingley and One World Sustainable Investments, and part of the Greening of the WSSD programme. The project is supported by a grant under the Department of Environmental Affairs and Tourism climate change programme, funded by the United States Agency for International Development (USAID).

### **What is the investment potential of Green Power?**

The Department of Minerals and Energy (DME) has suggested a targeted minimum increase of 5% of primary energy over the next decade in the proportion of Renewable Energy supplied into the South African Economy.

Integrated energy planning scenarios indicate a requirement for an overall energy supply of 3 800 peta Joules (Pj) by 2012. The DME's minimum target implies an estimated 190 Pj of new renewable energy and, within this, a new electricity generation capacity requirement of around 4 000 MW.

This corresponds to between US \$4-6 billion of investment – which translates to an average investment of US \$400-600 million per year for the next 10 years (not including any other investments in new green electricity generation capacity in the southern African region).

### **Who are our suppliers?**

#### **Solar**

BP petrol stations, owned by BP Southern Africa

Moshoeshoe Eco-village, owned by Sol Plaatje Municipality

GreenHouse Project PV system, owned by Earthlife Africa

AGAMA Energy PV system, owned by AGAMA Energy

Gardner PV system, owned by Len Gardner

Shell Renewables - Head Office, owned by Shell Renewables

Astropower - Ubuntu Village, owned by Astropower

Willi's Energy Savers, owned by Willi's Energy Savers

## **Wind**

Moeshoeshoe Eco-village, owned by Sol Plaatje Municipality

## **Bagasse**

Tongaat Hulett Sugar Mills, owned by Tongaat Hulett

Illovo Sugar Mills owned by Illovo

## **Hydro**

Friedenheim Hydro, owned by Friedenheim Co-op

## **Symbolic donations**

Tierras Morenas Wind Farm

## **Some Facts and Figures:**

- Wind energy is about 10 times as labour intensive per energy unit as nuclear energy.
- Wind-generated electricity is twice as labour-intensive as coal-fired power.
- Each unit of conventionally generated electricity consumes 1,2 litres of water and contributes 1kg of carbon dioxide to the problem of global warming.
- South Africa will need more electricity generation capacity within three to five years, and a decision needs to be made now about new power stations.

- Presently, a draft White Paper on Renewable Energy and Clean Energy Development stipulates that there should be an up to 5 percent increase in the use of green electricity by 2012.

ENDS

## **Annexure X. - Briefing Document 3**



23 May 2002

## **WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT WILL RUN ON GREEN ELECTRICITY**

AGAMA Energy, a green energy services company based in Cape Town, is to co-ordinate the supply of Green Electricity to the main venues at the World Summit on Sustainable Development (WSSD) between 24 August and 4 September 2002. This is a Department of Environment & Tourism initiative and is supported by the United States Agency for International Development (USAID).

Green Electricity, also called Green Power, is a growing worldwide phenomenon, explains Glynn Morris, managing director of AGAMA. Green Electricity is electricity generated in a sustainable manner from renewable energy resources such as wind, solar, wave, geothermal (heat from the core of the earth) and certain biomass (plant matter) and hydro energy.

'The key to Green Energy is not only that it is derived from renewable energy resources but that the electricity is generated as a sustainable process,' notes Morris.

'This makes it a very different product to the conventional coal- or nuclear-derived electricity, which is currently the predominant service option in South  
/more

page two

Africa. These forms of electricity are unsustainable because they rely on extraction of fossilised energy (such as coal) or mineral resources (in the case of uranium) for conversion into electrical energy. These resources are finite and will be ultimately be exhausted.'

Green electricity can be generated by anyone with access to sufficient renewable resources and the technical and financial capacity to implement an engineering project.

South Africa has excellent renewable resources, and in regions like the Western, Eastern and Northern Cape provinces, which import the bulk of their energy, renewable electricity generation close to the demand makes good sense – including lower transmission costs, greater reliability and, of course, reduced environmental impact.

At present there is more than 50Megawatts of green generation capacity in the Southern African Power Pool – this is enough energy to fulfil the needs of 20 000 households. South Africa itself presently has a small and un-coordinated installed capacity of green generation plants, including the hydro plants in the Eastern Cape (owned and operated by Eskom) and a number of Independent Power Producers in KwaZulu-Natal and Mpumalanga.

The National Electricity Regulator (NER), national government's electricity 'watchdog', is developing certification criteria and procedures for any potential green power producer to obtain certification of their electricity production.

/more

page three

While there is as yet no mechanism for trading green electricity in a regulated market in southern Africa, a likely mechanism is 'green power certificates'. A green power producer (certified and monitored by the National Electricity Regulator) will acquire green power certificates for any green power supplied onto the national grid. Any distributor or supplier (also licensed by the NER) that desires to offer a green electricity 'product' will be able to buy green power certificates to back up the sales to discerning customers. Green electricity sales will be regulated within a green electricity tariff structure to be established and regulated by the NER.

In addition to its environmental, safety, water-saving and health benefits, Green Electricity offers opportunities for small investors and entrepreneurs.

'The growth in electricity demand in South Africa is expected to outstrip the existing capacity within the next three to five years,' says Morris, 'and then there is the risk of what is known as "rolling blackouts". 'It is essential that South Africa creates new electricity capacity, and this means that we have a rare opportunity – to make an informed and considered choice about the sustainability of that electricity supply.'

ENDS

ISSUED BY: GALEFORCE COMMUNICATION

ON BEHALF OF: AGAMA ENERGY

FOR FURTHER INFORMATION PLEASE CONTACT:

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## **Annexure Y. - Briefing Document 4**

# GREEN POWER FOR THE WSSD

PROVIDING THE CONTEXT FOR A GOVERNMENT  
COMMITMENT TO RENEWABLE ENERGY

*a catalyst for new investment*

*The Green Power for the WSSD project, which co-ordinated the supply of Green Electricity to the Johannesburg Summit in August / September 2002, opens up investment opportunities in a green power market in southern Africa.*

*The green power for the WSSD project is made possible by a grant under the Department of Environmental Affairs and Tourism (DEAT) climate change programme, supported by USAID.*

*The Department of Minerals and Energy has suggested a targeted minimum increase of 5% of primary energy over the next decade (from 9% to 14% by 2012) in the proportion of Renewable Energy supplied into the South African economy.*

*The long-term goal is to shift the South African energy economy towards a more sustainable mix of energy supply systems.*

*Integrated energy planning scenarios indicate a requirement for an overall energy supply of 3800 peta Joules (PJ) by 2012. The DME's minimum target implies an estimated 190 PJ of new Renewable Energy and, within this, a new electricity generation capacity requirement of around 4000 MW corresponding to between US \$4 - 6 billion of investment. This translates to an average investment of US \$400 - 600 million per annum for the next ten years not including any other investment opportunity in the southern African region.*

*This investment in new green generation capacity is expected to yield:*

- JOBS • ENVIRONMENTAL BENEFITS • HEALTH BENEFITS
- LOCAL CONTENT MANUFACTURE AND POTENTIAL EXPORT OPPORTUNITIES

*The Green Power for the WSSD Project has established the basis for regulatory and trading mechanisms for a green power market, thereby reducing investment risk in this market.*



*The project team consists of AGAMA Energy, One World Sustainable Investments, GEO, Genesis Eco Energy, Charles Dingley, EDG, RAMBOLL, Galeforce Communication and Dill Pickle Products.*



## OBJECTIVES

### *of the Green Power for the WSSD project*

- **TO CREATE** a regulatory and trading framework for a Green Power market in SA.
- **TO FACILITATE** Green Electricity transactions during the WSSD to test this market framework.
  - **TO REDUCE** the negative effects of energy provision to the WSSD in a practical manner.
- **TO ENHANCE** the investment appetite for investments in new Green generation capacity in SA by demonstrating the viability of the market and reducing risks.
- **TO RAISE AWARENESS** about the processes and opportunities in a Green Power market.

#### **THE PROJECT STEPS INCLUDE:**

- Confirming interest and commitments by key venues to participate.
  - Undertaking energy audits at four venues.
- Developing a set of criteria for certification of Green Power producers.
- Developing a trading regime for Green Power using tradeable Renewable Energy certificates. Liaising with the National Electricity Regulator (NER) to finalise the system of Green Electricity supply for the WSSD.
  - (Visit the NER stand at the South African Pavilion at the Ubuntu Village)
    - Developing a Green Electricity tariff.
    - Liaising with the CDM including the JCL.
- Monitoring and evaluation of the consumption, production and environmental impacts of the project during the WSSD.
- A communication programme to inform the public and stakeholders of the concept of Green Power / Electricity and the opportunities arising from it.
  - Source tradeable renewable energy from green power producers.

#### **THE FOLLOWING ARE PROVIDING GREEN ELECTRICITY FOR THE PROJECT:**

##### **Solar:**

Certain BP petrol stations, owned by BP Southern Africa  
 Moshoeshoe Eco-village, owned by Sol Plaatje Municipality  
 GreenHouse Project PV system (Joubert park), owned by Earthlife Africa  
 Gardner PV system, owned by Len Gardner  
 Willi's Energy Savers, owned by Willi's Energy Savers

##### **Wind:**

Moshoeshoe Eco-village, owned by Sol Plaatje Municipality  
 (Visit the Sida / Sol Plaatje stand in the South African Pavilion at the Ubuntu Village)

##### **Bagasse:**

Tongaat Hulett Sugar Mills  
 Illovo Sugar Mills

##### **Hydro:**

Friedenheim Hydro  
 Ceres Hydro

##### **Overseas donations:**

Tierras Morenas Wind Farm - Costa Rica  
 ENEL - Italy (geothermal)

**FURTHER APPLICATIONS ARE STILL BEING PROCESSED**

## **Annexure Z. - Briefing Document 5**

# Green Power for the WSSD

Glynn Morris – AGAMA Energy (Pty) Ltd

The catalyst for a green power market in  
southern Africa?

April – November 2002

a project grant under the DEAT climate change program  
funded by USAID



# The Opportunity

- ❖ The Department of Minerals and Energy has suggested a targeted minimum increase of 5% of primary energy over the next decade (from 9% to 14% by 2012) in the proportion of Renewable Energy supplied into the South African economy.
- ❖ The long term goal is to shift the South African energy economy towards a more sustainable mix of energy supply systems.
- ❖ Integrated energy planning scenarios indicate a requirement for an overall energy supply of 3800 peta Joules (PJ) by 2012.
- ❖ The DME's minimum target implies an estimated 190 PJ of new renewable energy and, within this, a new electricity generation capacity requirement of around 4000 MW
- ❖ This corresponds to an investment of between US\$4 - 6 billion of investment, i.e. an average investment of US\$400 – 600 million per annum for the next ten years.
- ❖ This excludes any new investments in new green electricity generation capacity in the southern African region.



# The Benefits

❖ This investment in new green generation capacity is expected to yield :

- Jobs
- Local content manufacture and potential export opportunities
- Environmental benefits
- Health benefits



# Project Objectives

- ❖ establish a regulatory and trading context for a green power market in SA
- ❖ facilitate a pilot project to test the interest and functionality of this framework
- ❖ reduce the negative effects of energy services provision to the WSSD
- ❖ stimulate investment in new green power generation systems in South Africa
- ❖ develop capacity and skills in the green power sector



# Project partners

- ❖ JOWSCO
- ❖ Sandton Convention Centre, Hilton Sandton, NASREC Expocentre, Ubuntu Village
- ❖ National Electricity Regulator (NER)
- ❖ City Power
- ❖ Green Power generators
- ❖ Media



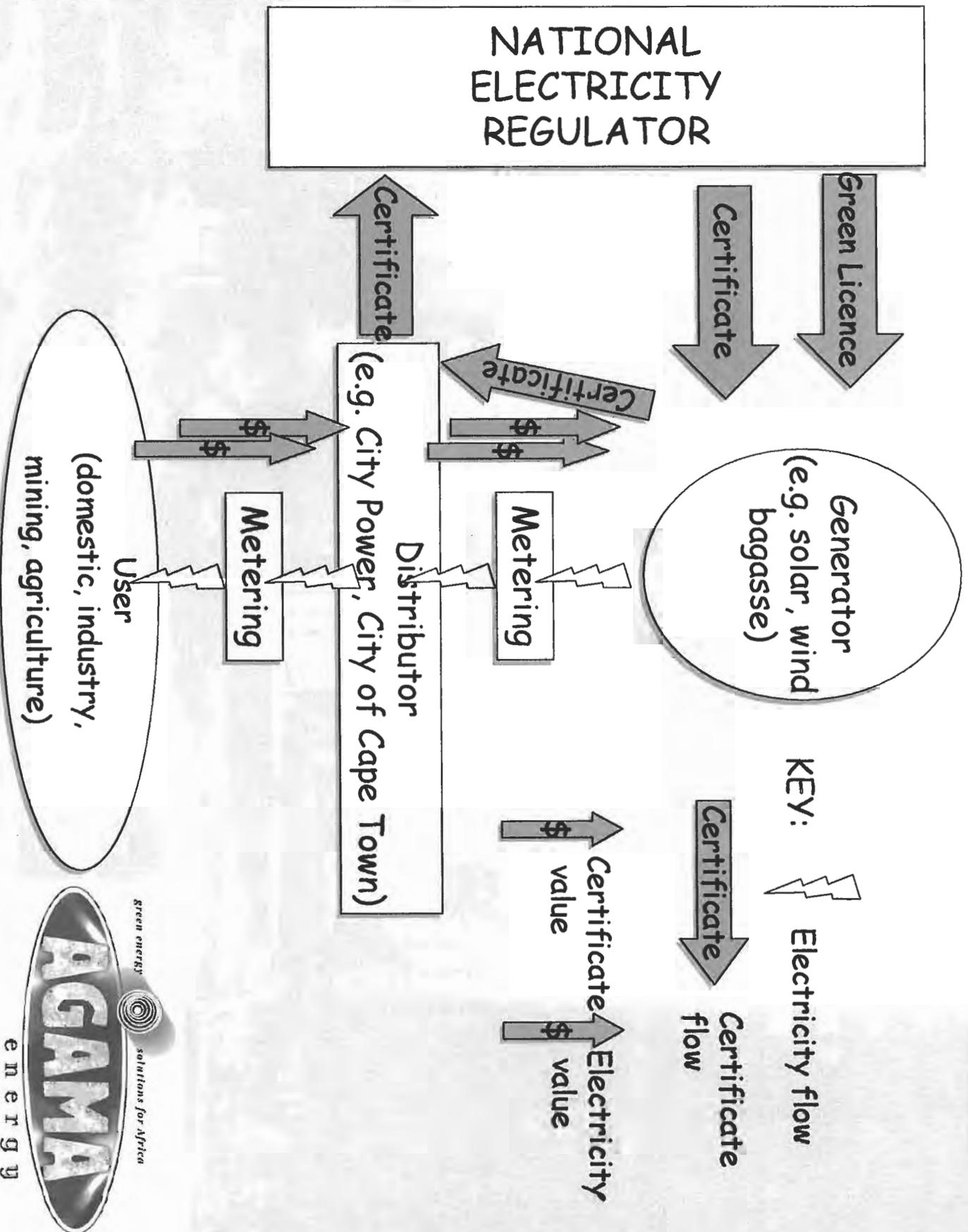
# Intervention

- ❖ Determine the energy service needs of the WSSD venues
- ❖ Develop a green electricity trading mechanism
- ❖ Develop the criteria for certification of green generators by the NER
- ❖ Develop a green electricity tariff
- ❖ Identify and source green power generation capacity in SA
- ❖ Liaison with CDM initiatives
- ❖ Monitoring and evaluation
- ❖ Public awareness

# Progress

- ❖ Letters of commitment by WSSD venues to buy Green Power
- ❖ Energy audits for venues and determination of electricity needs for WSSD
- ❖ Endorsement of the project by the Board of the National Electricity Regulator
- ❖ Development of regulatory and trading framework for green electricity for the NER
- ❖ Development of criteria for certification of green electricity generators in South Africa
- ❖ Participation by City Power as a key project partner
- ❖ Development of a green electricity tariff for City Power





# Criteria for certification

- ❖ The certification process will include the following basic steps:
  - Application to NER for certification by a power producer
  - Assessment of resource utilization (resource disclosure)
  - Assessment of sustainability criteria (EIA, social and financial assessments)
  - Quantification of the power and production capacity
  - Issue of certificate
  - Monitoring



# Criteria for certification

Eligible energy sources	Comments
Solar	Grid-connected and utility off-grid
Wind	Grid-connected and utility off-grid
Biomass	Wood, crop residues, clean wood waste, clean food processing waste, biodiesel, clean landfill gas Biomass component of co-fired plant
Hydro	Existing hydro – run-of-river plant with an installed capacity of less than 30 MW New hydro – any scale as long as the project complies with environmental, social and economic legislation and oversight procedures (such as EIA's)



# Criteria for certification

Ineligible energy sources	
Coal	Non-renewable
Nuclear	Non-renewable
Natural gas	Non-renewable
Diesel / Heavy fuel oil	Non-renewable
Paraffin	Non-renewable
Unsorted solid waste	Environmentally problematic
Sewage sludge	Environmentally problematic
Potential sources ( to be developed )	
Negawatts	Baselines and verification issues need to be clarified
Landfill gas (methane)	Environmental criteria, such as emissions, need to be established and regulatory mechanisms set in place

# Progress cont'd

- ❖ Registration of >60 MW of green power generators with the NER including:
  - 13 new individual solar PV systems in southern Africa including a system for the GreenHouse Project
  - 1 new wind electricity system in Kimberley
  - 2 existing hydropower systems in W Cape and Mpumalanga
  - 5 existing bagasse co-generators in Kwazulu Natal
  - 1 symbolic trade from a wind system in Costa Rica
  - 1 symbolic trade from a geothermal system in Italy
- ❖ More registrations in progress



# Progress cont'd

- ❖ Conference plan:
  - 10% Green Power in SA by 2012  
scheduled for April 2003
- ❖ Monitoring and evaluation including:
  - metering and data acquisition at each of the four venues
  - data analysis and integration into the Sustainability Barometer
  - reporting against indicators



# Progress cont'd

- ❖ Liaison and co-ordination with Greening the WSSD Project programme
- ❖ Public awareness including:
  - <25 articles in the print media
  - 2 television interviews
  - 6 radio interviews
  - Exhibition stand for DEAT
  - Ongoing coverage of process 'til 30<sup>th</sup> November



# Other Key Points

- ❖ Briefings with Minister Phumzile Mlambo-Ncguka of Minerals and Energy
- ❖ Briefings with Regional Electricity Regulator, RERA
- ❖ Participation in international research on implementation of Tradeable Renewable Energy Certificates
- ❖ Input to the DME's White Paper on Renewable Energy and Energy Efficiency



# Where to from here

- ❖ Consolidation of experience
- ❖ Formalisation of the market mechanisms
- ❖ Green power market assessment
- ❖ Roll out of a long term programme



## **Annexure AA.- Communication Strategy for Green Electricity for the World Summit on Sustainable development**

# **Communication Strategy for Green Electricity for the World Summit on Sustainable Development**

## **Introduction**

Green Electricity has the potential to enhance The World Summit on Sustainable Development (WSSD) by ensuring that the entire operation leaves as small an environmental 'footprint' as possible.

The main WSSD venues require electricity, and the current electricity supply in South Africa is derived mostly from fossil-fuel generation, which has negative climate-change implications.

There is existing green electricity generation capacity in South Africa, which until now has not been identified or valued as such.

AGAMA Energy has been contracted as part of an initiative by DEAT, supported by USAID, to implement a project plan for the supply of green electricity to the main WSSD venues and ensure that the maximum number of relevant target audiences learn of the venture.

This document sets out the communication strategy for the project.

## **Goal**

To create maximum awareness of the supply of Green Electricity to the WSSD venues, and the resulting reduced environmental 'footprint' of the Summit altogether and the other associated socio-economic benefits of Green Electricity.

## **Objectives**

- To create maximum awareness of the fact that there are different types of electricity available.
- To tell relevant target audiences what Green Electricity is – and what it is not.
- To inform relevant target audiences that Green Electricity will be supplied to the WSSD.

- To explain to relevant target audiences how this Green Electricity will be certified and traded.
- To inform relevant target publics of the poverty alleviation / job creation capacity of Green Electricity.
- To inform relevant target publics that Green Electricity is an international trend.
- To engender support for the concept of Green Electricity and its viability and necessity.
- To create interest or stimulate demand for green electricity among other electricity consumers

## **Situation Analysis**

### **Strengths**

- AGAMA Energy has a project team with a wealth of experience, backed by all the relevant stakeholders. This gives both the team and the project credibility within the relevant industry and communities.
- The project is in line with national and international policy, and has government support, which lends it further credibility.
- South Africa needs new electricity generation capacity, which means that the project is necessary for South Africa's economic growth.
- Green electricity is sustainable; saving water and greenhouse gas emissions, this includes the 'feel-good' factor
- Through the provision of green electricity, a number of jobs will be created, as electricity provision will be decentralised and smaller-scale.
- Green Electricity will ultimately impact on alleviating poverty – the funding would not have been granted to AGAMA Energy without this capacity, albeit an indirect consequence.

### **Weaknesses**

- The team is primarily not drawn from the previously disadvantaged sector; however, training and skills transfer is in place.
- The project team has a limited amount of time in which to accomplish an enormous task!

- The project team is small, and the perception may exist that it is therefore inexperienced and unknown
- The team is not creating any new green electricity, but making use of what is already there; however, it is important that the target publics become aware of the existence of this Green Electricity.

The project team is not based in Johannesburg.

### **Opportunities**

- Through this media campaign, AGAMA Energy and the project team will work to change perceptions relating to weaknesses and threats
- There is a heightened awareness sustainable energy issues in the press due to the impending WSSD.
- To link up with the communications and publicity activities of JOWSCO, DEAT, WSSD venues, Eskom, USAID and NER, most of whom have their own media programmes for the WSSD and beyond.

### **Threats**

- Eskom electricity is cheap, and is perceived as a vital element to South Africa's economic growth.
- Eskom wishes to work toward extending the life of the current power stations by means of its 'switch-off' (demand side management) policies.
- Green Electricity has a somewhat elitist reputation.

### **Target audiences**

#### **Internal stakeholders**

- Jeremy Burnham and Jameson Hlongwane, JOWSCO
- Lowazi Tyani, DEAT
- Rose Mary Romano, USAID
- Saliem Fakier, IUCN
- Richard Flack Davison, Sandton Convention Centre
- Hannes Venter, Kagiso Exhibition Centre
- Rashaad Civil Society Secretariat
- Steven Marsden, UBUNTU Village

- Wolsey Barnard, Willie Boeije, Naresh Singh, National Regulator
- Kosi Lisa, Elsa du Toit, DME
- Peter Nelson, Eskom
- Eskom's Johannesburg distributor and City Power

### **External**

- Media (print and electronic) – refer to Database
- Opinion leaders:
  - Government: Ministers of Minerals and Energy and Tourism, Finance, Trade and Industry, Public Enterprises, Water Affairs and Forestry
  - Richard Worthington, Earthlife Africa, SECCP and SA-CAN
  - Steve Sawyer, Greenpeace
  - Patrons
  - Local / community leaders in areas where Green Electricity is produced
  - Common Ground
  - Relevant NGOs and community organisations
  - Electricity supply industry (local and international)

### **Action Plan**

#### **Database**

The database will include all relevant media:

- Websites
- Local trade magazines
- International trade magazines
- Regional newspapers
- National newspapers
- International newspapers and supplements
- Local internal newsletters for relevant stakeholders/organisations
- International internal newsletters for relevant stakeholders
- Relevant intranets and e-zines
- Relevant employee magazines / publications
- Local and international news agencies
- Community newspapers

- Relevant NGO publications and websites
- National, regional and community radio stations
- Relevant television slots, (eg Summit TV, Infochannel)

### **Media releases and follow-ups (print and electronic)**

Media releases will be carefully planned and targeted, as the media is likely to be deluged with information relating to the WSSD. Releases must therefore be relevant and newsworthy.

Ongoing liaison with the project team will generate a supply of 'human interest' stories for community papers; snippets; technical news for the trade press; region-specific stories; development/poverty alleviation stories, etc.

At least two media releases per grouped target public (ie, regional press, trade press, national radio, community papers) will be produced per month.

Evaluation: Media analysis

### **WSSD official media**

Relevant WSSD officials will be contacted to ensure that the official literature / 'gift bags' / media kits / information packs, etc. carry details of the Green Electricity project.

### **Media events**

These will 'create' news to feed to the press, in the form of high-impact media site visits to Green Electricity venues; visits by patrons to these sites; 'sod-turnings'; the 'switching on' of the Green Electricity at the Summit, etc.

Evaluation: Media analysis

Supplementary activities: media kit, photographs

### **World Environment Day**

Tie in with other relevant activities and media.

### **Feature proposals**

Editors of relevant magazines/newspaper 'beats' will be contacted with in-depth feature proposals (or similar angles to media releases).

Evaluation: Media analysis

**Photographs**

Newsworthy and relevant photographs (see Media Events, above) will be distributed to the relevant media. In many instances, the press will feature a photograph and caption rather than a feature or snippet.

Evaluation: Media analysis

**Exhibition barometer**

A site will be booked (piggy-backing with other stakeholders, if necessary) in the foyer of a relevant venue (to be decided), with a 'barometer' charting the use of electricity at the particular WSSD venue,

**Competition**

The competition will focus on the delegates to the WSSD, to raise awareness of the Green Electricity project. Flyers will be printed, where possible, with details of the competition (including details of the Green Electricity website, etc).

The specific mechanics of the competition are to be confirmed (local entrants only? Judges? Announcement of winner – Where? When?). However, it will take the form of a 'estimate how much electricity has been used / saved/ during the WSSD', and the person closest to the correct figure will receive a relevant prize (the prize could be a solar panel for the home, solar water heater, etc).

The competition offers another angle for publicity before the WSSD ('look out for the competition at the summit – perhaps have a non-delegate entry category as well?); and 'roving' competition entry takers will ensure that Green Electricity is top of mind for delegates.

Evaluation: media analysis, number of entrants, informal surveys, queries

**Radio interviews**

Relevant programme managers will be contacted with proposals for radio interviews, in order to generate interest and inform the relevant target publics about the Project.

Patrons could also be interviewed, to talk about why the Project is important to them; stakeholders could talk about the necessity and relevance of the project; relevant community leaders could talk about the impact of Green Electricity among their people.

Contact details will be given during the show.

Evaluation: Telephone enquires as a result of the show, media analysis

### **TV interviews / features**

Relevant programme managers will be contacted with proposals for interviews and site visits.

Contact details will be given during the show.

Evaluation: Telephone enquires as a result of the show, media analysis

### **Advertorials**

In order to guarantee media coverage and therefore the achievement of our goal, it might be necessary to place strategic advertorials where publication is to write exactly what it chooses, and publication is guaranteed.

Included in the initial database will be a list of all the national / regional/ trade supplements and focus areas, for possible selection and booking.

### **Website**

Website content will be updated regularly, to serve as a reference for relevant stakeholders as well as for interest parties. All communication with the media and stakeholders will carry details of this website.

### **Patrons**

Possible patrons: Cyril Ramaphosa, Mamphele Ramphele, Miriam Makeba, Hugh Masekela, Mark Shuttleworth, Graca Machel, Anita Roddick, Tim Mathopha (the headmaster of Bokgoni Technical High School in Atteridgeville, which received the best technical matric results nationwide last year), sportspeople..., Cheryl Carolous, Tim Modise

### **Other possible activities**

- Media briefings

- Open days
- School visits / MTN Science Centre demonstrations – children would love to hear about Green Electricity, and communicate this to their parents...
- Posters, promotional items
- The recording of a radio PSA (Public Service Announcement)

### **Additional evaluation**

During any media events and at the summit, informal, face-to-face research will be conducted (focus areas to be established). A formal sample survey, formal evaluation form or formal questionnaire could also be compiled and evaluated.

## Activities Chart

	May	Jun	July	Aug	Sept	Oct	Nov
Develop database	X	X					
Maintain database		X	X	X	X	X	X
Briefing document	X						X
Solicit patrons	X	X					
Media releases (print)	X	X	X	X	X	X	X
Media releases (radio)	X	X	X	X	X	X	X
Media releases (internal communication media)	X	X	X	X	X	X	X
Television proposals			X			X	
Media releases (trade)	X	X	X	X	X	X	X
Feature proposals (all relevant media)	X	X	X	X	X	X	X
Internet page (create)			X				
Maintain / update internet page				X	X	X	X
Competition		X	X	X	X	X	X
Media events / site visits		X	?	X			
Onsite media liaison				X	X		
Media kits for WSSD				X	X		
Prepare exhibition barometer		X	X	X	X		
Web cam preparation			X				
Web cam implementation				?	?		
Advertorials (book and write)	?	?	?	?	?	?	?
Media briefing and follow-up media kit (success and long-term strategy)						X	X

ENDS

This Communication Strategy has been compiled by Galeforce  
Communication in conjunction with the AGAMA Energy project consortium.

Galeforce Communication is a communication consultancy specialising in environmental and social responsibility projects. Based in Westlake Square, Tokai, Galeforce has worked with Agama Energy since its inception, as well as with other environmental organisations such as The Natural Step, Terramare Environmental Data Systems, Ecobe Environmental Monitoring Systems and the Cape Metropolitan Council.

Gail Jennings, the founding member of Galeforce, is an established environmental writer, having published such work in the Mail & Guardian, The Money Standard (Standard Bank), The Motorist (Automobile Association) House & Leisure, TLC magazine (SA Medical Association) Clicks Club magazine, Equinox (Southern Sun), City Press, The Sowetan and Ilifa Labantu (Robben Island Museum)

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## **Annexure BB. - Press file**

### AGAMA ENERGY: PRESS CUTTINGS FOR WSSD

<u>PUBLICATION</u>	<u>DATE</u>	<u>HEADLINE</u>
The Cape Argus		Glynn set to give development summit the green light
Sustainable energy Society of Southern Africa (SESSA)	April 2002	Green Power for the World Summit on Sustainable Development
ESI Africa	Issue 2 of 2002	Green Electricity for the World Summit
The Cape Argus	28 May 2002	'Green' Electricity is not as clean as we think
The Cape Argus	31 May 2002	How green power pays back investment
Business Day website	19 August 2002	World Summit venues to use environmentally friendly power
Business Day	2 June 2002	World Summit venues to use environmentally friendly power
Mail & Guardian	28 June to 4 July 2002	An opportunity to go green
Woza website	15 August 2002	A touch of 'green' electricity at the World Summit
All Africa website	19 August 2002	An Opportunity to Go Green
Engineering News website	18 July 2002	Green Energy plan for Joburg summit
The Star	22 July 2002	"Green' electricity power for clean world summit
Business Report Mercury	23 July 2002	Agama poised to give green light on energy
Business Report Star	23 July 2002	Agama poised to give green light on energy
The Star	29 July 2002	Electricity and Renewable Energy in Sustainable Development
Sawubona – (SAA's inflight magazine)	August 2002	Green the WSSD
Odyssey	August / September 2002	Green Energy Global Vision
Diamond Field Advertiser	13 August 2002	Eco-village to supply World Summit with 'green' power
The Natal Witness	22 August 2002	Agama Energy opens grid for green power at the world summit
Biosphere	August 2002	WSSD to run on Green Electricity
The Cape Times	22 August 2002	Eskom's latest study is blowing in the wind
The Cape Times Business Report	22 August 2002	i) Green electricity from sugar, timber may be on cards ii) Illovo able to supply electricity to SA grid
Engineering News website	19 August 2002	Green energy investors conference planned
Acumen	Issue 8 – 2002	Green Power
Welcome: Official Magazine of the WSSD	26 August – 4 September 2002	Your planet needs you
The Big Issue	September 2002	Green Power: World Summit special -Going Green
Farmers Weekly	15 November 2002	Green Power, Friedenheim Hydropower

## **Annexure CC.     -Preliminary project accounts**

Green Power for WSSD accounting totals		
<b>Allocation of expenses</b>		
Air fares	R 85,831	
Accommodation	R 6,459	
Car Hire	R 7,015	
Other travel	R 5,400	
Advertising etc	R 35,289	
Courier	R 1,008	
<b>Total expenses</b>	<b>R 141,002</b>	
<b>Allocation of fees</b>		
AGAMA	R 458,050	
EDG	R 24,121	
Ramboll	R 23,093	
GEOcc	R 77,176	
One World	R 51,558	
Genesis	R 10,400	
Galeforce Communication	R 64,646	
Green Light Solutions	R 71,136	
<b>Total fees</b>	<b>R 780,180</b>	
<b>Total fees and expenses</b>		<b>R 921,182</b>
<b>Total paid</b>		<b>R 921,681</b>

<b>FLIGHTS</b>						
<b>No. of flights</b>	<b>use date</b>	<b>Amount</b>	<b>person</b>	<b>Purpose</b>	<b>Inv no.</b>	<b>Invoice date</b>
1	25-Apr	<b>R 3,361.00</b>	Morris	Jhb to finalise grant agreement and visit JOWSCO	8879	24-Apr
2	05-Jun	<b>R 6,698.00</b>	Harris + Morris	Jhb to Audit venues and visit DME in Pretoria	9204	04-Jun
3	13-Jun	<b>R 10,345.00</b>	G Morris, C Fedorsky, C Purcell	3 flights to Jhb, audits, Citypower, DME	9283/9284	
3	20-Jun	<b>R 10,065.00</b>	G Morris, C Purcell, C Dingley	3 flights to Jhb, audits Nasrec, Citypower, SCC		
1	21-Jul	<b>R 3,353.00</b>	G Morris	SCC, Hilton, JOWSCO, IUCN	9637	19-Jul
2	10-Jul	<b>R 6,702.00</b>	Morris Jennings	IUCN, Citypower, NER, JOWSCO	9528	09-Jul
1	01-Aug	<b>R 3,351.00</b>	Terra Travel G Morris	SCC, IUCN, Greenhouse Project	9716	31-Jul
1	12-Aug	R 3,357.00	Jennings	WSSD	9796	
1	13-Aug	R 3,357.00	Morris Jhb	WSSD	9796	
1	19-Aug	R 2,696.00	Morris Jhb	WSSD	9796	
	subtotal	<b>R 9,410.00</b>			9796	08-Aug
		R 1,230.00	Fedorsky		9242	
			Jennings		9241	
1	11-Sep	<b>R 1,943.00</b>	Morris	Citypower, NER - the way forward	10106	05-Sep
1	17-Sep	<b>R 16,612.00</b>	Morris	7th Green Power Mkting Conference, Washington DC	10209	17-Sep
1	04-Nov	<b>R 3,351.00</b>	Morris	Project function with NER and Citypower		
		<b>R 85,831.00</b>				

Advertising, courier, printing and other expenses			
Date	Amount	person	Details
2-May-02	1870	BDFM	Green Electricity advert in Business Day
10-Jun-02	1200	Benson Arendse	Presentation for World Environment Day - schools programme Malmesbury
31-May-02	154	Brainstorm	Typesetting letterhead for press releases
27-May-02	342	Akwandze Design	Typesetting Green Power advert
7-Feb-02	980	Newsclip	Media Monitoring -press cuttings
7-Sep-02	200	American Chamb.Commerce	G Morris - attendance of meeting -Ruell Khosa Chairman of Eskom
30-Jun-02	1899	Scarborough Publications	Advert in ESI magazine
30-Sep-02	2125	Jeremy Jowell	Photographs - World Environment Day - project showcase + photos of team
27-Aug-02	1250	Jenny Mason	Initial copy for Green Radio campaign (pd by chq) 100402
21-Oct-02	1992	Newsclip	Media Monitoring- press cuttings
30-Sep-02	1395	Telkom	ISDN line for internet display at Ubuntu Village
to be paid 30 Nov	3000	Dill Pickle Products	Design and print of Green Power for WSSD flyers
to be paid 30 Nov	2000	Dill Pickle Products	Design and print of Green Power for WSSD poster
to be paid 30 Nov	6000	Added Aspect	Design and construction of website pages and links to relevant websites
to be paid 30 Nov	1197	Added Aspect	Conversion of documents (GE tariffs, GE framework, GE criteria) to PDF files
to be paid 30 Nov	3332	Picasso Headline	Full page Green Power for WSSD advert in S.A Development handbook
to be paid 30 Nov	1200	Dill Pickle Products	Invitation for NER function
4-Nov-02	5154	Café 41	End of project function 46 guests from SEPCO,NER,Citypower etc
	<b>35288.52</b>		
Courier			
7-Apr-02	139	DHL	NASREC letter pickup
6-Jul-02	139	DHL	Documents to Jhb
9-Jul-02	139	DHL	Documents to MegaTech
22-Aug-02	590.55	DHL	Duty for inverter to be used for GE supplier Gardner in Cape Town
	<b>1007.55</b>		
<b>Total</b>	<b>36296.07</b>		

Accommodation							
Contribution towards accommodation costs							
Nights	Rate						
30	150	4500	M Harris 30 nights in Jhb for WSSD project				
11	150	1650	R Kharivhe 11 nights in Jhb for WSSD project				
1	309.39	309.39	Hotel accom Mr C Purcell 14/6/2002				
		<b>6459.39</b>					

AGAMA Energy						
Invoice date	P/ment date	Hours/days	R value hours	Expenses	Type/expenses	Total
14-May		18.5	48016.8	6716	2 airfares	54732.8
			0	740		740
30-Jun		50.2	130520	357.4		130877.4
24-Aug		62.0	161200			161200
30-Nov		42.5	110500			110500
			0			
			0			
<b>Total</b>		<b>173.2</b>	<b>450236.8</b>	<b>7813.4</b>		<b>458050.2</b>













<b>Car Hire</b>			
<b>Use date</b>	<b>Amount</b>	<b>person</b>	<b>Purpose</b>
05-Jun	275.01	Harris	Visit DME etc
13/14 Jun	711.64	Morris	Venue audits
20-Jun	469.52	Morris	Venue audits
'10/12-Jul	738.27	Morris	NER
22 Jul	290.17	Morris	Citypower/NER
01-Aug	427.83	Morris	SECCP
12/14/Aug	615.18	Morris	WSSD
19-Aug	284.72	Morris	WSSD
15/9	687.13	Morris	NER/Citypower
12/16 Aug	758	Jennings	WSSD
11/15Sep	687.13	Morris	NER
23/25 Oct	454.59	Morris	NER/Citypower
4/5 Nov	616.22	Morris	End of project function with NER/Citypower
	<b>7015.41</b>		
7-Aug-02	<b>5400</b>	M Harris	Travel costs - use of own vehicle Cpt - Jhb and travel in Jhb - 4000km x R1.50 per km This was more cost-effective than air travel and hiring a vehicle for 28 days.
Travel total	12415.41		

**A Parallel Event to the WSSD in Johannesburg**  
**Tradable Renewable Energy Certificates:**  
**A Tool to Promote Renewable Energy for Sustainable Development**

**28<sup>th</sup> August 2002**

**9:30 am – 4:45pm**

**HOUGHTON BOARDROOM**

**17 Fifth Street, Houghton, Johannesburg (15 minutes from the Sandton Centre)**

Tradable Renewable Certificates (TRECs) can be used as an economic instrument to support the development of renewable energy schemes in industrialised and developing countries. The use of TRECs could effectively support the Brazilian Energy Initiative being proposed for inclusion at WSSD.

The seminar will benefit from the presence of representatives from around the world. The objectives of the seminar are to:

- stimulate interest in TRECs;
- provide an insight into the opportunities for using TREC mechanisms in developing countries;
- provide information to national policy makers on the workings of TREC systems;
- identify focal points for an international TREC network;
- encourage commitment from various players to develop TREC systems and take part in trial TREC trades.

**Draft programme**

9:00	<b>Registration</b>	
	<b><i>The political dimension</i></b>	
9:30	Welcome from the Chair and Vision Statement	Corrado Clini, Minister of the Environment, Italy
9:40	The Brazilian Energy Initiative – An overview	Prof. Jose Goldemberg, Brazil
10:00	The Brazilian Energy Initiative and TRECs - A view from the North	Dr Amin Amal-Lee, Strategy Unit, UK Cabinet Office
10:20	The Brazilian Energy Initiative and TRECs - A view from the South	Dr Wolsey Barnard, National Electricity Regulator, S. Africa
10:40	Discussion	
11:00	<b>Coffee-break</b>	
	<b><i>The role of TRCs around the world</i></b>	
11:30	Presentation of the initiative to develop a world-wide network for information exchange on TRECs (TRECKIN)	Dr John Green, IT Power
11:45	TRECs in Europe	Hans Sneider, CEA
12:00	TRECs in the USA	Kurt Johnson, US EPA
12:15	TRECs in southern Africa: The catalyst for investment in a green power market	Glynn Morris, AGAMA Energy
12:30	Discussion	
12:45	<b>Lunch</b>	
	<b><i>How can TRCs help support renewable energy in developing countries?</i></b>	
14:00	<i>Company experience:</i> Guatemalan Hydroelectric facility's green certificate transaction with NUON	Annemarie Goedmakers, Director Nuon Renewables
14:20	<i>Government experience:</i> Selling TRECs to the Netherlands	Dutch Government Official
14:40	<i>Trader's experience:</i> An emerging market for TRECs	Ashley Houston, APX
15:00	<i>Discussion</i>	
15:20	<b>Coffee-break</b>	
	<b><i>The way forward</i></b>	
15:40	The way forward for energy in the WSSD process	Kirsty Hamilton, UKBCSE
16:00	The way forward for renewables in the international TRECKIN network	Dr John Green, IT Power
16:15	<i>Panel Discussion</i>	Chaired by Marianne Haug, Director of Energy Efficiency and Technology, IEA
16:45	<b>Close</b>	

*N.B. This programme is provisional and the speakers are still being confirmed.*

**This seminar is part of a series organised through the Tradable Renewable Certificate Know-how and Initiatives Network (TRECKIN) project, supported by the European Commission.**

**The International Energy Agency (IEA) has provided support to enable the seminar to take place.**

## **Annexure EE. – Presentation to the TRECKIN Workshop**

C:\AGAMA\Projects\034. Green Power for WSSD\Task 9 - Project documentation\final report - 21.11.2002.doc

# TRECs in Southern Africa

The catalyst for a green power market  
in southern Africa?

Green Power for the WSSD – A Pilot Project

a project grant under the DEAT climate change program funded by USAID

Glynn Morris – AGAMA Energy (Pty) Ltd



# The context

- The RE sector in SA is a cinderella industry
- It is a real business sector in the SA economy - but very small at present, say approx. R100 million per annum
- It is probably stagnant or shrinking in real terms (no reliable stats - hard to tell)
- The potential for excellent economic growth is twofold
  - sectoral growth of the industry itself
  - added value to other sectors
- Environmental considerations - mostly very positive
- Government policy is essentially conducive to growth of the sector
- There is no investment 'pull' to grow the sector in SA



# The opportunity

- The SA Department of Minerals and Energy has suggested a targeted minimum increase of 5% of primary energy over the next decade (from 9% to 14% by 2012) in the proportion of Renewable Energy supplied into the South African economy
- The long term goal is to shift the South African energy economy towards a more sustainable mix of energy supply systems
- Integrated energy planning scenarios indicate a requirement for an overall energy supply of 3800 peta Joules (PJ) by 2012
- The DME's minimum target implies an estimated 190 PJ of new renewable energy and, within this, a new electricity generation capacity requirement of around 4000 MW
- This corresponds to an investment of between US\$4 - 6 billion of investment, i.e. an average investment of US\$400 – 600 million per annum for the next ten years
- This excludes any new investments in new green electricity generation capacity in the southern African region



# The project plan

- Determine the energy service needs of the WSSD venues
- Develop a green electricity trading mechanism
- Develop the criteria for certification of green generators by the NER
- Develop a green electricity tariff
- Identify and source green power generation capacity in SA
- Liaison with CDM initiatives
- Monitoring and evaluation
- Public awareness



# The project partners

The Department of Environment Affairs and Tourism

USAID

JOWSCO

Greening the WSSD Project

Venues

Sandton Convention Centre

Hilton Sandton

NASREC Expocentre

Ubuntu Village

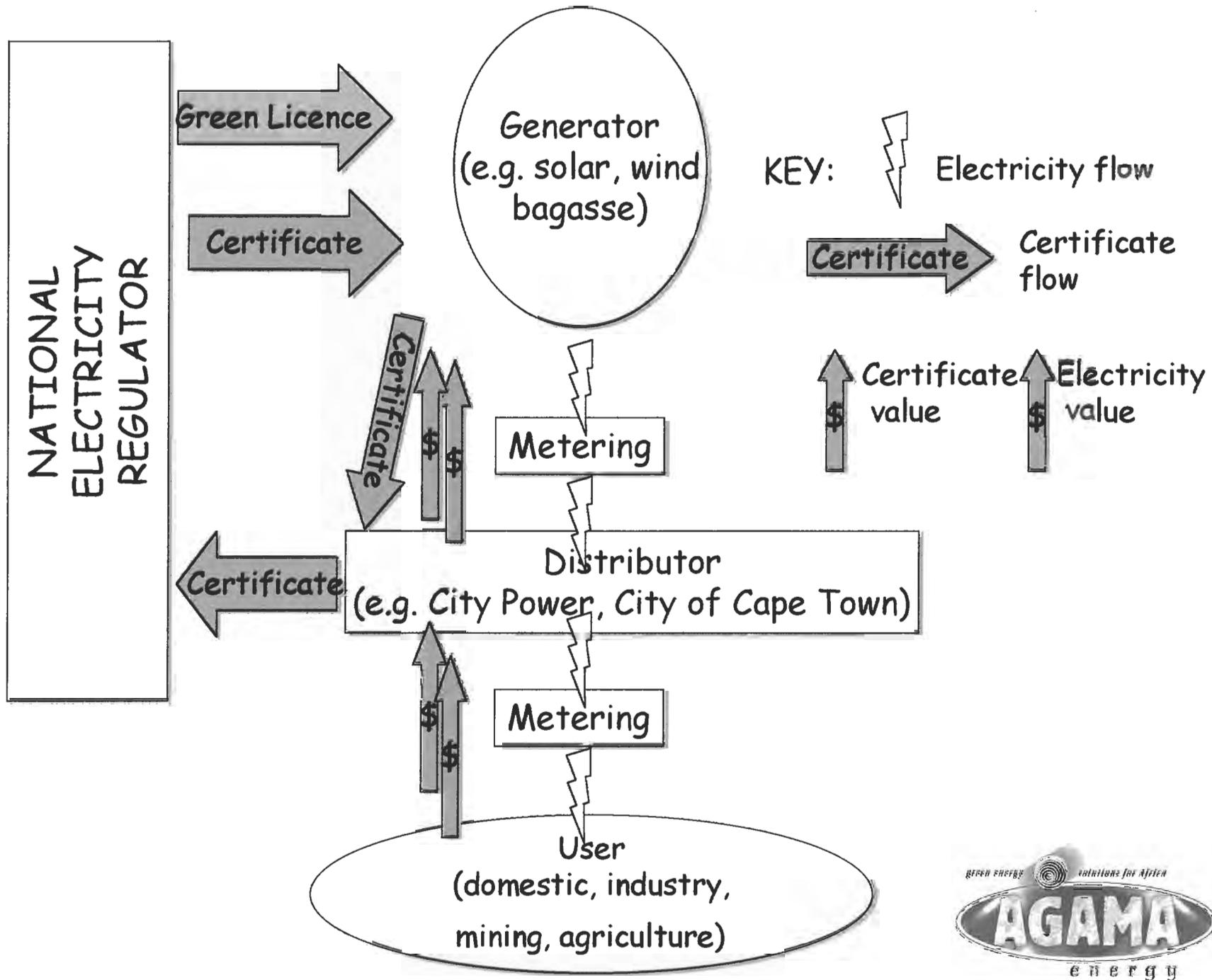
National Electricity Regulator (NER)

City Power

Green Power generators

Media





# The demand and tariff

- Demand

All four main venues committed to participating

Two venues supplied by City Power were included:

- Ubuntu Village: 700 – 900 MWh over 29 days
- NASREC Expo Centre: 1190 MWh over 39 days

- Tariff

A simple energy based tariff

On a voluntary basis

Up to a maximum of 50c/kWh



# The sources

- Registration of >60 MW of green power generators with the NER including:
  - 13 new individual solar PV systems in southern Africa including a system for the GreenHouse Project
  - 1 new wind electricity system in Kimberley
  - 2 existing hydropower systems in W Cape and Mpumalanga
  - 5 existing bagasse co-generators in KwaZulu Natal
  - 1 symbolic trade from a wind system in Costa Rica
  - 1 symbolic trade from a geothermal system in Italy
- More registrations in progress



# The questions

Will the state commit to the targets in the draft White Paper?

What is the scale and nature of the market for green power in southern Africa?

A mandatory market (a renewable energy portfolio)?

A voluntary market (public sector and corporate sector)?

How is a 'grid-feeder' approach accommodated?

What are the synergies, regulatory and marketing implications of a CER market and a TREC market in SA?

How are off-grid electricity generators and DSM initiatives included?

How quickly can the WSSD experience be integrated into the core business of the NER and RERA?

What is the long term opportunity for international trades?



# Next steps

- Confirm status and constraints on the project
- Commission a business plan / feasibility study based on new green power market environment
- Assess new investment and funding opportunities
- Investigate the local content and skills development opportunities



## **ACKNOWLEDGEMENTS**

The author and AGAMA Energy would like to acknowledge the contribution of the many people who have reviewed and commented on the various versions of this document.

Our specific thanks are due to Mr Richard Flack-Davison at Sandton Convention Centre.

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## Abbreviations

### General abbreviations

DB	Distribution board
LPG	Liquified petroleum gas
PF	Power factor
LV	Low voltage

### Units

kWh	kilowatt-hour
MWh	megawatt-hour
MJ	megaJoule
kVA	kilovolt-ampere
kV	kilovolt
kW	kilowatt
kl	kilolitre
kg	kilogram
ton	1000 kg

### Conversion factors

1 kWh of electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>.

1 kWh of electricity generated by Eskom consumes 1.21 litres of H<sub>2</sub>O

## **Annexures**

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### **Annexure A. - Letter of Commitment –Sandton Convention Centre**

## **Annexure B. - Letter of Commitment – NASREC Expo Centre**

## **Annexure C. – Energy Survey Report for Sandton Convention Centre**

# GREEN POWER FOR THE WSSD PROJECT

## ENERGY SURVEY

### SANDTON CONVENTION CENTRE

---



July 2002

**Prepared by:** Chris Purcell, Energy & Development Group

**Prepared for:** Glynn Morris, AGAMA Energy (Pty) Ltd

This report is an output of the Green Power for the WSSD Project which is a grant under the South African Department of Environmental Affairs and Tourism (DEAT) climate change program which is supported by the United States Agency for International Development (USAID).

SANDTON CONVENTION CENTRE

17 June 2002

The Project Leader  
Green Power for WSSD Project  
P O Box 606  
Constantia  
7848

**Attention:** Mr Glynn Morris

Dear Mr Morris

**GREEN POWER FOR WSSD – Confirmation of participation in the project**

I refer to our discussions re: the above project.

Firstly, on behalf of the Sandton Convention Centre I wish to endorse the overall goals and objectives of the project.

Arising from our discussions, I am pleased to confirm that Sandton Convention Centre will participate in the project by concluding negotiations with all stakeholders for the supply of a green electricity service to Sandton Convention Centre for the duration of the WSSD activities – namely 01 August 2002 to 30 September 2002 (or as per each venue).

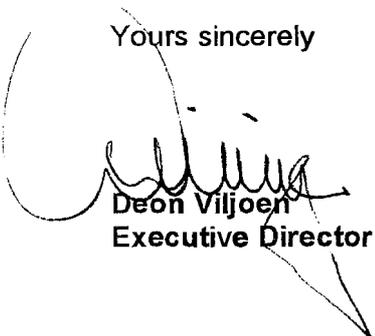
The undertaking to participate is based on the understanding that:

- The Sandton Convention Centre will not be required to pay any more than would normally have been the case under the present supply agreement with ESKOM / City Power.
- The Sandton Convention Centre will provide access to the consumption data (meter readings) on a daily basis for the duration of the project. These may be in the form of direct physical access or indirectly in cases where WSSD security measures preclude direct access.
- There is no obligation by the Sandton Convention Centre to purchase or use green electricity beyond the project period.

I confirm that I am duly authorized to commit the Sandton Convention Centre to participate in the project as set out above.

In conclusion, the Sandton Convention Centre looks forward to participating in the project in the interests of a more sustainable basis for conducting our business.

Yours sincerely



Deon Viljoen  
Executive Director

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**and**  
**SPECIALISED EXHIBITIONS (PTY) LTD**  
**T/A**  
**EXPO CENTRE**

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03 July 2002

The Project Leader  
Green Power for WSSD Project  
P O Box 606  
Constantia  
7848

Attention: Mr Glynn Morris

Dear Mr Morris

**GREEN POWER FOR WSSD – Confirmation of participation in the project**

I refer to our discussions re: the above project.

Firstly, on behalf of the Expo Centre I wish to endorse the overall goals and objectives of the project.

Arising from our discussions, I am pleased to confirm that Expo Centre will participate in the project by concluding negotiations with all stakeholders for the supply of a green electricity service to Expo Centre for the duration of the WSSD activities – namely 05 August 2002 to 06 September 2002 in accordance with the existing agreement.

The undertaking to participate is based on the understanding that:

- The Expo Centre will not be required to pay any more than would normally have been the case under the present supply agreement with ESKOM / City Power.
- The Expo Centre will provide access to the consumption data (meter readings) on a daily basis for the duration of the project. These may be in the form of direct physical access or indirectly in cases where WSSD security measures preclude direct access.
- There is no obligation by the Expo Centre to purchase or use green electricity beyond the project period.

I confirm that I am duly authorized to commit the Expo Centre to participate in the project as set out above.

In conclusion, the Expo Centre looks forward to participating in the project in the interests of a more sustainable basis for conducting our business.

Yours sincerely



**J.P. VENTER**  
**MANAGER : EXPO CENTRE**

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letter of commitment

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## 1. Introduction

This energy survey of the Sandton Convention Centre (the Centre) was undertaken as part of the build-up to the World Summit on Sustainable Development (WSSD) which is scheduled to take place in South Africa between 19 August and 4 September 2002. The survey forms part of the Green Power for the WSSD Project to assess the impact of energy demand of the summit and to meet this demand with Green Electricity.

The aims of this survey, in order of priority and increasing complexity, are:

- to estimate the demand for energy and resources by the Sandton Convention Centre over the summit period
- to estimate the equivalent CO<sub>2</sub>, H<sub>2</sub>O and other produced/consumed under the current energy supply situation, and how this could be offset if the Centre were supplied with Green Electricity instead
- to bench-mark the Centre in terms of energy consumption (in comparison with international norms and standards)
- to comment on the energy management set-up within the Centre, and suggestions for improvements.

A meeting was held on site with the Centre's Contract Services Manager – Richard Flack-Davison, on 13 June 2002, when an inspection of the facilities was undertaken and key requirements for information outlined. Additional information was forwarded in the following days.

## 2. General Description

### 2.1 Building

The Sandton Convention Centre is centrally located in Maude Street, Sandton. It is managed by Southern Sun Holdings.

It is one of six convention and exhibition centres in and around Johannesburg, the others being Gallagher Estate, The Dome, Expo Centre Johannesburg at Nasrec, Kyalami and Caesar's.

The Centre was built in mid-2000, and is an ultra-modern establishment offering the highest level services and facilities. Gross let-able floor area is approximately 22 000 m<sup>2</sup> (excluding

Energy Survey: Sandton Convention Centre

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covered parking and offices), and the building can accommodate up to 10 000 visitors at any one time.

The building is split over four main levels of approximately 6000 m<sup>2</sup> each in with a combination of Exhibition halls, Convention rooms, Boardrooms, Committee rooms, Pavillion, and foyers, with additional mezzanine levels in between. There is an additional level for underground basement parking. Full details of the building layout and let-able floor areas are in the Centre brochure.

## 2.2 Available spaces

Description	Qty	Total area, m <sup>2</sup>
Exhibition	2	11 000
Ballrooms	4	3 985
Ballroom foyers	1	712
Boardrooms	7	1 155
Boardroom foyers	1	600
Committee rooms	5	809
Committee room foyers	1	903
Pavilion and foyers	1	5 338
Offices	1	500
Southern Sun Kitchen	1	768
Café Select	1	1 296
<b>Total internal</b>		<b>27 066</b>
Underground parking	1	4 860
Basement plant rooms	1	1 620
<b>Grand Total</b>		<b>33 546</b>

## 2.3 Energy service needs

All interior spaces are fully illuminated and serviced. All spaces are air-conditioned (25 000 m<sup>2</sup>), with the exception of the underground parking which is ventilated only. Exhibition rooms are equipped with facilities for additional power supply for high power demand exhibits and additional lighting.

## 2.4 Fuels

All services requiring energy are powered by electricity, with the exception of the standby diesel generators, which make only a very minor contribution to overall energy picture, and only then for brief periods.

## 2.5 Occupancy

Due to the large size of the venue, and complicated by the multitude of simultaneous, independent events, of various durations varying from one hour to several weeks taking place, it has not been possible to determine 'average utilization' of space, nor to track this seasonally. However, it is noted that the Centre is 'always busy', except over the December/January period, which is a quiet period.

Exhibition space is let out at a per-m<sup>2</sup> cost, with an additional separate electricity bill for the period during build-up, the event itself, and break-down.

# 3. Resource Usage

## 3.1 Electricity

The average monthly electricity bill is R116 000. The average monthly energy consumption is 768 MWh. The average charge per kWh consumed is 15.0 c/kWh. The average monthly maximum power demand is 2 MVA, and the average load factor is 53%.

### 3.1.1 Tariff

The applicable tariff is the Eskom Megaflex T42 tariff. This is based on energy used (time-of-use tariff), with additional maximum demand charges, and a reactive energy charge. The charges as of May 2002 are:

Period	Demand charge	Energy charge
April-September	R 12.31 / kVA	22.22c / kWh peak time 12.31c / kWh standard time 7.14c / kWh off-peak
October-March	R 11.02 / kVA	19.87c / kWh peak time 11.11c / kWh standard time 6.39c / kWh off-peak

3.1.2 Trends

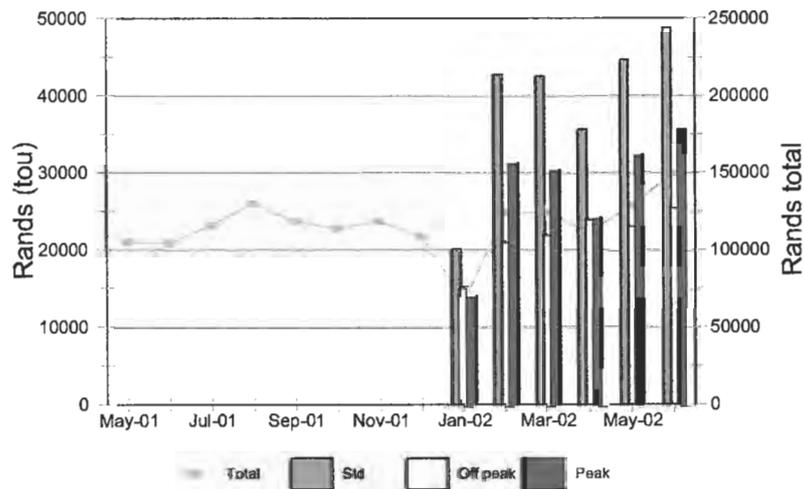


Figure 1: Graph of costs (Rands spent in total) of energy at the various times-of-use.

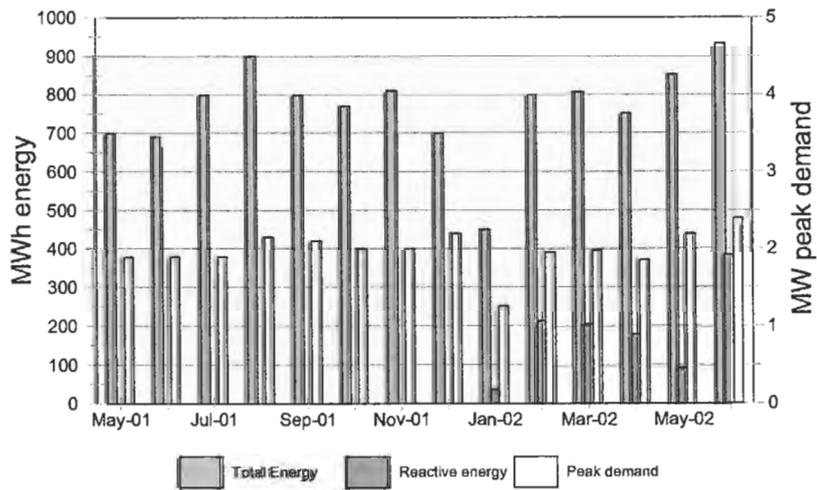


Figure 2: Graph of Energy (total MWh), ReactiveEnergy (MWh), and Peak Demand (MW).

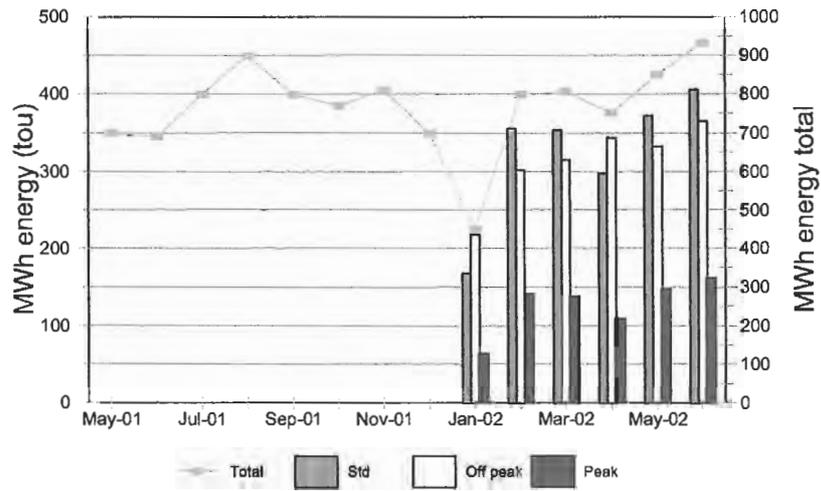


Figure 3: Graph of total energy (MWh), and energy consumed at the various times-of-use.

### 3.1.3 Electricity usage by service

Based on the one month of data logged from the various kWh sub-meters (see section 4.1) between the beginning of May 2002 till end of June 2002, the usage of electricity for services is proportioned approximately as follows:

Energy Survey: Sandton Convention Centre

Service	Location	Percentage of total energy
General lighting	Basements	2%
General energy (exhibition areas)	Levels 0,1	12%
	Levels 2,3	7%
	Levels 4,5	8%
Lifts, emergency services (excluding refrigeration)	Whole building	13%
Air-conditioning	Whole building	34%
Restaurants (general supply, cooking)	Café Select, Southern Sun kitchen	14%
Restaurant (refrigeration only)	Southern sun kitchen	9%

Note that these proportions may show substantial seasonal variation, and should be monitored over time to track the trends.

### 3.2 Water

Water is purchased from City of Johannesburg. The average monthly bill is R30 000. The average monthly consumption is 3 000 kl. The average charge is R11.54/kl.

Approximately 25% of the water is consumed in wet cooling towers for air-conditioning system.

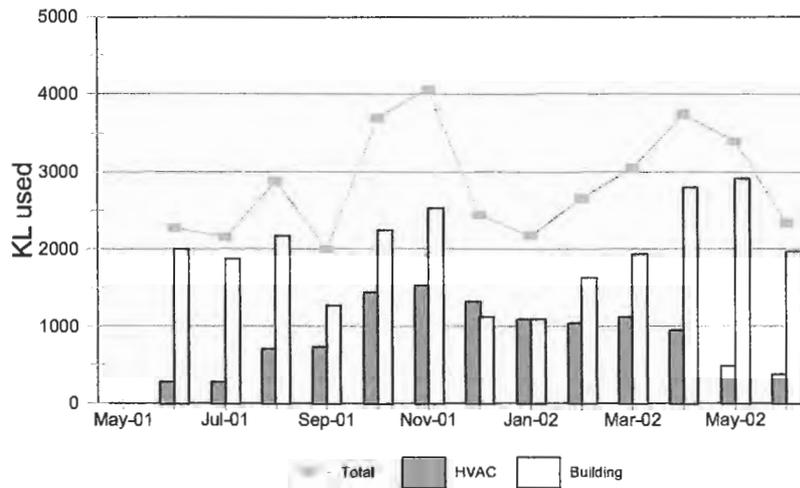


Figure 4: Graph of water consumption trends

### 3.3 Comparison with occupancy / seasonality

It is not possible to undertake a sensitivity analysis of effect of seasonal utilization on the energy and water demand since insufficient history of data has been provided, and detailed data on occupancy levels was not available.

However, some information can be ascertained from the monthly water consumption data, and from the electricity data:

- Air-conditioning water consumption data is dependent both on the outside air temperature for two reasons: a) this affects the wet-cooling towers water consumption, b) the duration of running time of air conditioner compressors, which also correlates with the reactive power component of the electricity bill.
- The water consumption of the building itself may be an indicator of the building occupancy: ie very quiet in December January, and busier from May onwards. This also correlates with the consumption of electricity (MWh).

### 3.4 Contribution to CO<sub>2</sub> produced, and total H<sub>2</sub>O consumed

#### 3.4.1 CO<sub>2</sub>

- Electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>/kWh.

### 3.4.2 H<sub>2</sub>O

- Electricity generated by Eskom consumes 1.21 litres/kWh to generate.

The overall CO<sub>2</sub> produced and H<sub>2</sub>O consumed as a result of the energy consumption, and general consumption is:

	Summer months		Winter months	
<b>CO<sub>2</sub> production</b>				
Indirect due to: Electricity generation	800 MWh @ 0.77 kg CO <sub>2</sub> /kWh	<b>576 tons</b>	900 MWh @ 0.77 kg CO <sub>2</sub> /kWh	<b>693 tons</b>
<b>Water consumption</b>				
Indirect due to: Electricity generation	800 MWh @ 1.21 l/kWh	968 kl	900 MWh @ 1.21 l/kWh	1 089 kl
Direct due to: Building consumption		1 629 kl		2 796 kl
Direct due to: Air-con towers		1 088 kl		487 kl
<b>Total water</b>		<b>3 685 kl</b>		<b>4 372 kl</b>

### 3.5 Bench mark of energy usage

It is possible to benchmark the energy for the Centre as a whole.

Energy used for the overall centre:

- 10 200 MWh per annum for 25 000 m<sup>2</sup> = 463 kWh/m<sup>2</sup>/annum.

This figure is comparable with similar centers in South Africa

Energy used excluding catering facilities:

- 7 140 MWh per annum for 22 000 m<sup>2</sup> = 324 kWh/m<sup>2</sup>/annum.

Examining the catering establishments alone,

Catering establishments alone:

- 3 060 MWh per annum for 10 002 m<sup>2</sup> = 3 060 kWh/m<sup>2</sup>/annum.

This figure is relatively high in comparison with typical specialised catering establishments.

## 4. Technical Issues

### 4.1 Metering

The building is very well metered for electricity, with numerous sub-meters available. This enables good tracking of electricity usage, but unfortunately the detailed information is available for one month only. No details of the Main Reticulation schematic were made available. DB's and meters are as follows:

KWh Meter	Area covered	Description	Note
Eskom Main	Whole site	Bulk supply and max demand	
Sub 1 DB BM(E)	Supply and Emergency mains for critical areas around whole building	All lifts and escalators, refrigeration, emergency lighting, fire extraction and supply, roller shutters and gates, committee rooms, supplementary supplies	
Sub 1 DB BM	Level -2, -1	Lighting, power points	
Sub1 DB AC1 Sub1 DB AC2	Whole building	Air-conditioning plant	+ Separate sub-meters for chillers
Sub 2 DB MM	Level 0, 1	Lighting, power points	+ Separate sub-meters for each of the 8 sectors
Sub 3 DB CMM	Level 2, 3		
Sub 4 DB RM	Level 4, 5, lifts		
DB RM(E) DB RM KE DB CMK(E)	Southern Sun: out-sourced kitchen.	Refrigeration	Sub-meter to DB RM
		Bulk supply / max demand	Sub-meter to DB CMM
Not used		Bulk cooking / blast chilling / regeneration	
DB AM/K DB EM(E)	Café Select	Cooking, restaurant	Sub-meter to DB BM

All meters are fully capable digital power meters capable of measuring peak/off/peak energy consumption, maximum demand, kVAh, etc.

## **4.2 Building management**

There is a building management system which should ensure that unutilized parts of the building are not supplied with lighting or air-conditioning services unnecessarily. The building management system also optimizes operational control of the air-conditioning plant duty cycle.

## **4.3 Load levelling**

There is no evidence of specialized load levelling plant to minimize energy demand in the peak demand times. It is anticipated that the building-management system will optimize the air-conditioning plant operation, especially chiller and boiler operation.

## **4.4 Power factor correction**

There is physical space available on site in a room earmarked for power-factor correction plant. This plant has not yet been installed. The savings to be made due to PF correction are only of the order of R6 000 per month, and only in summer when the air-conditioner compressors are running in high duty cycle, as they are the primary cause of this.

## **4.5 Air-conditioning**

The air-conditioning cooling towers located on the roof are wet-type, and that they display a relatively high water consumption, which is also seasonally variable (i.e. higher in summer months). Also, air-conditioning is also the main contributor to reactive energy charges.

Air-conditioning in summer months costs around R34 000 per month for electricity component and R11 000 per month for water, or an average of R2.0/m<sup>2</sup> per month to operate on the full 25 000 m<sup>2</sup>.

## **4.6 Lighting control**

The lighting levels in any of the exhibition spaces can be adjusted by varying the main lights power to one of five levels (0-100%), in graduations of 25%.

## **4.7 Load factor**

The average load factor is in the range between 51-54%.

## 4.8 Back-up generator

The backup generator capacity of 2 x 800 kVA is considered sufficient for nearly the whole building.

In practice, this backup capacity actually serves the supply and emergency mains for critical areas around whole building including:

- all lifts and escalators,
- refrigeration,
- emergency lighting,
- fire extraction and supply,
- roller shutters and gates,
- committee rooms, supplementary supplies for exhibitions

## 5. Estimates of demand for the WSSD

The period of use of the Centre during the WSSD will be approximately:

Activity	Duration	Period
Build-up and establishment	9 days	09 Aug.-18 Aug.
Summit Exhibition	16 days	19 Aug.-04 Sept.
Breakdown	5 days	04 Sept.-09 Sept.
<b>Total</b>	<b>30 days</b>	09 Aug.-09 Sept.

The number of visitors during the daytime will be limited to approximately 6000 (out of total carrying capacity of 10 000), and the nighttime personnel will be approximately 1200.

Hours of operation during the WSSD period will be:

Daytime: 09h00-22h00

Nighttime: 22h00-09h00

### 5.1 Projection of direct resource consumption

During 30 days of activity and full utilization of the Centre during the WSSD period in late winter/spring, the following consumptions are projected:

- readings: MWh consumed, but include details of TOU MWh, PF, peak demand, reactive power.

Sub-meters:

- DB's BM, BM(E), AC1, AC2, MM, CMM, RM
- Sub-DB Southern Sun kitchen: refrigeration
- Sub-DB Southern Sun kitchen: general energy
- Sub-SB Café Select

The attached spreadsheet shows how the various meter readings can be used to obtain approximate consumption per electricity service.

#### **6.4 Water**

- Main building meter: daily reading
- Air-conditioning plant meter: daily reading

## **Annexure D. - Energy Survey report for NASREC**

# GREEN POWER FOR THE WSSD PROJECT

## ENERGY SURVEY

### NASREC EXPO CENTRE

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July 2002

**Prepared by:** Chris Purcell, Energy & Development Group

**Prepared for:** Glynn Morris, AGAMA Energy (Pty) Ltd

This report is an output of the Green Power for the WSSD Project which is a grant under the South African Department of Environmental Affairs and Tourism (DEAT) climate change program which is supported by the United States Agency for International Development (USAID).

## **ACKNOWLEDGEMENTS**

The author and AGAMA Energy would like to acknowledge the contribution of the many people who have reviewed and commented on the various versions of this document.

Our specific thanks are due to Mr Hannes Venter and Jenny Fourie at NASREC Expo Centre and Anton Booyzen of City Power.

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## Abbreviations

### General abbreviations

DB	Distribution board
LPG	Liquified petroleum gas
PF	Power factor
LV	Low voltage

### Units

kWh	kilowatt-hour
MWh	megawatt-hour
MJ	megaJoule
kVA	kilovolt-ampere
kV	kilovolt
kW	kilowatt
kl	kilolitre
kg	kilogram
ton	1000 kg

### Conversion factors

1 kWh of electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>.

1 kWh of electricity generated by Eskom consumes 1.21 litres of H<sub>2</sub>O

## 1. Introduction

This energy survey of the NASREC Expo Centre, Johannesburg, (referred to as the Centre) was undertaken as part of the build-up to the World Summit on Sustainable Development (WSSD) which is scheduled to take place in South Africa between 19 August and 4 September 2002. The survey forms part of the Green Power to the WSSD Project to assess the impact of energy demand of the summit and to meet this demand with Green Electricity.

The aims of this survey, in order of priority and increasing complexity, are:

- to estimate the demand for energy and resources by the NASREC Expo Centre over the summit period
- to estimate the equivalent CO<sub>2</sub>, H<sub>2</sub>O and other produced/consumed under the current energy supply situation, and how this could be offset if the Centre were supplied with Green Electricity instead
- to bench-mark the Centre in terms of energy consumption (in comparison with international norms and standards)
- to comment on the energy management set-up within the Centre, and suggestions for improvements.

A meeting was held on site with the Centre's Managers – Hannes Venter, Jenny Fourie, on 20 June 2002, when an inspection of the facilities was undertaken and key requirements for information outlined. Additional information was forwarded in the following days.

## 2. General Description

### 2.1 Building

The NASREC Expo Centre, Johannesburg, is located on the corners of Nasrec and Randshow Roads approximately 7 km south of central Johannesburg. It is managed by Mr J P (Hannes) Venter and five staff members.

It is one of six convention and exhibition centres in and around Johannesburg, the others being Sandton Convention Centre, Gallagher Estate, The Dome, Kyalami and Caesars.

Energy Survey: NASREC Expo Centre

The Expo Centre was built in 1984, and was at the time the only available space for large exhibitions in Johannesburg. It was previously run by the Witwatersrand Agricultural Society, and has facilities for agricultural exhibitions. Excluding the agricultural areas, the gross let-able exhibition floor area is approximately 42 000 m<sup>2</sup> (excluding parking and offices) and can cater for several hundred thousand visitors at any one time.

The facilities are distributed in separate buildings spread over the large site area of about 52 Ha including a combination of exhibition halls, function rooms, conference and breakaway rooms, an arena and an amphitheatre, and outside exhibition areas. Details of the building layout and let-able floor areas are shown in the Expo Centre brochure which is available from the marketing office.

## 2.2 Available spaces

Description	Qty	Total m <sup>2</sup>	
Exhibition Halls	6	38 800	Ranging from 2400 m <sup>2</sup> to 12304 m <sup>2</sup>
Ballrooms	1	2 420	
Conference Centres	2	1 793	
Breakaway rooms	5	1 743	
Function Room	1	152	
Function room side rooms	2	153	
Offices	1	500	
Kitchen and restaurants	1	1500	
Total internal		47 061	

## 2.3 Energy services

All interior spaces are fully lit and serviced. None of the exhibition halls are air-conditioned (except for a retro-fit to one small hall but this is not used), natural ventilation is used to accomplish the task, and only the offices are air-conditioned. Exhibition rooms are equipped with facilities for additional power to supply high power demand exhibits and additional lighting.

## 2.4 Fuels

Major services requiring energy are supplied by electricity. The exceptions are: the standby diesel generators, which make only a very minor contribution to overall energy picture and are used only to provide short-term lighting to enable halls to be evacuated

in case of emergencies or power failure; and the overhead mono-rail train system which uses diesel engines (but will not be operational during the WSSD).

## 2.5 Occupancy

Despite the competition from the newer conference centres, the Expo Centre is still used by a wide range of clients, from liberation movements and political party conferences, sporting events such as the Soweto Marathon, local metropolitan councils, and for many years the Rand Easter Show, Auto Africa and Electra Mining Exhibitions. There are additionally two full-time tenants, both involved in catering, one of which uses the facility as a base more or less throughout the year, and the other who provides services only during major exhibitions and functions.

Figure 1 shows the percentage space utilization for each month for the period January 2001 to April 2002. The utilization varies dramatically, peaking in April each year, as for the past few years with nearly 100% utilization during the Rand Easter Show.

Each exhibition hall is charged out at a per m<sup>2</sup> cost, plus separate electricity and water bills for the period during build-up, the event itself, and break-down.

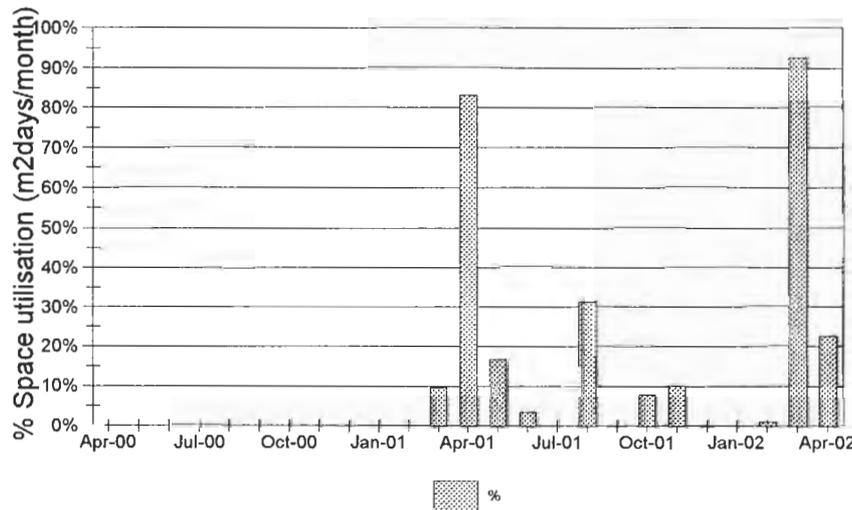


Figure 1: Space utilization as a percentage of the total available

### 3. Resource usage

#### 3.1 Electricity

The average monthly bill for electricity is R 105 000. The average monthly energy consumption is 301 MWh. The average charge per kWh consumed is 35.0 c/kWh. The average monthly maximum power demand is 1.33 MVA.

The maximum available supply is 10 MVA. The average load factor (monthly) is only 31%.

However, the consumption pattern varies extremely, and is critically dependent on the occupancy and site utilization, ranging from 80 MWh to 1300 MWh/month.

##### 3.1.1 Tariff

The applicable tariff is Johannesburg City Power Maximum Demand 11 kVA. This is based only on energy used, with additional maximum demand charges. There is no reactive energy charge, and no time-of-use charge.

Charges as of May 2002 are:

<b>Demand charge</b>	<b>Energy charge</b>
55.49 R/kVA	10.01 c/kWh

This tariff appears quite punitive for high demand periods with very low load factor.

##### 3.1.2 Trends

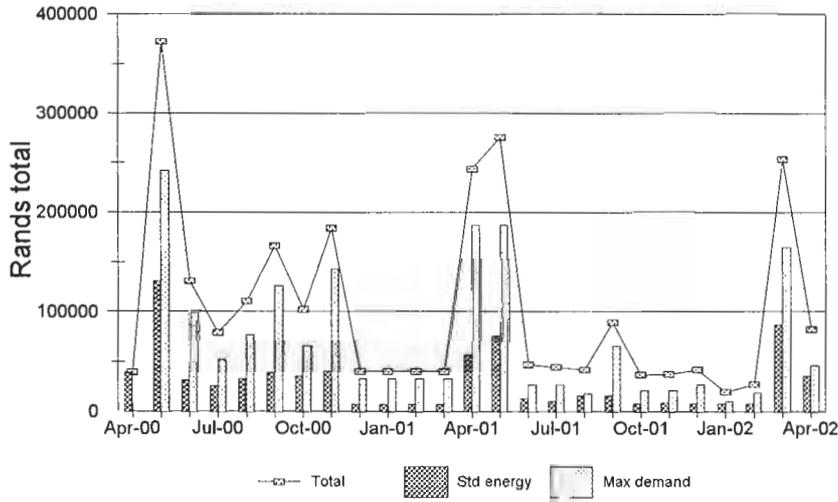


Figure 2: Graph of costs (Rands spent in total) of energy and maximum demand.

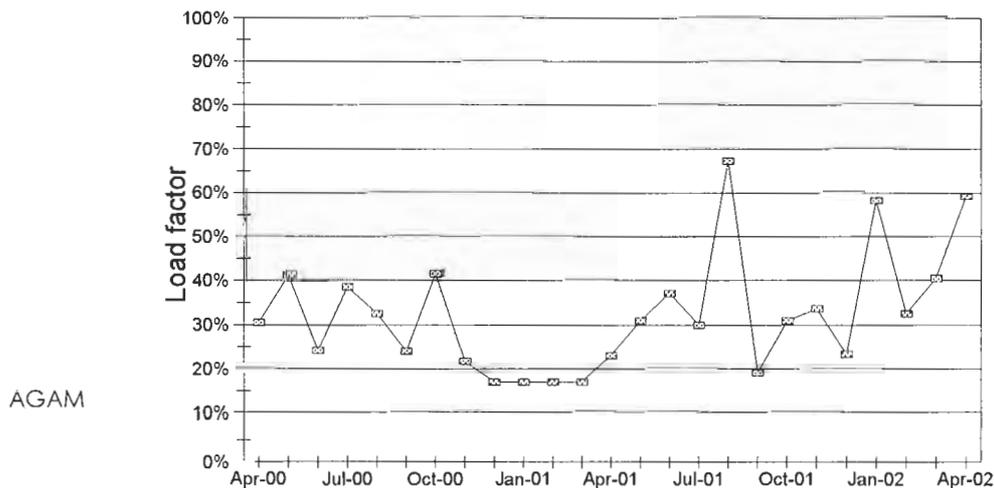
Punitive maximum demand charges account for more than 75% of the electricity bill, compared with low charges for the actual energy consumed.

Figure 3: Graph of Energy (total), kVA max demand.

Figure 4: Graph of load factor

### 3.1.3 Electricity usage by service

The bulk of energy is for lighting within halls, special demands for exhibitors, and mast lighting at the parking and open areas, and there is virtually no energy demand for air-



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conditioning.

Two food halls' tenants consume energy year round, but their actual consumption is highly seasonal. In months of low utilization of the Expo Centre, the food tenants account for about 14% of electricity consumption and 10% of maximum demand, but during high Centre usage they consume only 5% of energy. The balance of energy and maximum demand during low usage months is consumed by office and other infrastructure necessary to keep the Centre operational.

Usage / Period	Energy	Max demand
Food Tenants (December: low Centre usage)	12 MWh 14% of energy component	0.1 MVA 10% of maximum demand
Food Tenants (March: peak Centre utilization)	47 MWh 5% of energy component	0.27 MVA 10% of maximum demand
Office and other center infrastructure	70 MWh	<b>0.5 MVA</b>

### 3.2 Water

Water is purchased from City of Johannesburg.

The average monthly bill is R46 000. The average monthly consumption is 4 600 kl, but peaks at 28 000 kl during high demand periods. The average charge is R10.00/kl.

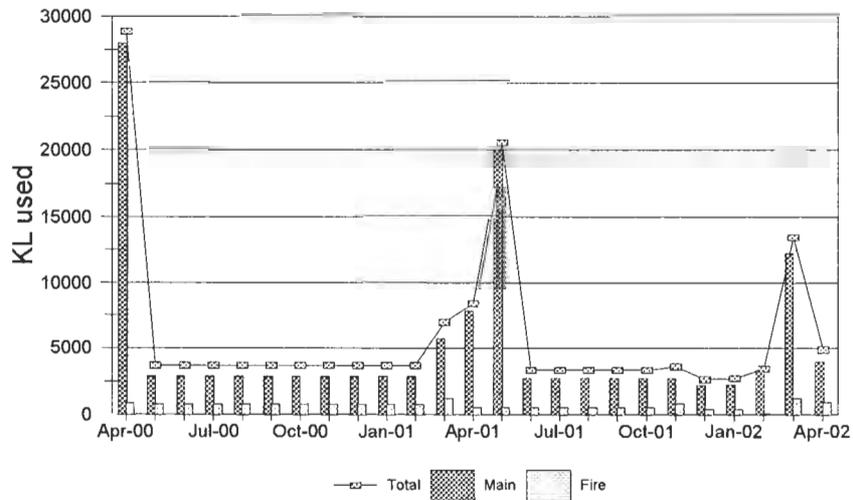


Figure 5: Graph of water consumption trends

### 3.3 Comparison with occupancy / seasonality

In general, energy and water consumption patterns at the Centre are critically dependent on the level of usage of the Centre, and this is clear from the graphs showing massive peaks during the time of the Rand Easter Show.

It is not possible to undertake an analysis of the effect of warm/cold seasons on the Centre’s energy and water bills, but the effect is not likely to be large.

### 3.4 Contribution to CO<sub>2</sub> produced, and total H<sub>2</sub>O consumed

#### 3.4.1 CO<sub>2</sub>

- Electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>/kWh.

#### 3.4.2 H<sub>2</sub>O

- Electricity generated by Eskom consumes 1.21 litres/kWh to generate.

The overall CO<sub>2</sub> produced and H<sub>2</sub>O consumed as a result of the energy consumption, and general consumption is:

	Average month		Peak usage month	
<b>CO<sub>2</sub> production</b>				
Indirect due to: Electricity generation	300 MWh @ 0.77 kg CO <sub>2</sub> /kWh	<b>231 tons</b>	900 MWh @ 0.72 kg CO <sub>2</sub> /kWh	<b>693 tons</b>
<b>Water consumption</b>				
Indirect due to: Electricity generation	300 MWh @ 1.21 l/kWh	363 kl	900 MWh @ 1.21 l/kWh	1 089 kl
Direct due to: Building consumption		4 000 kl		20 000 kl
<b>Total water</b>		<b>4 363 kl</b>		<b>21 089 kl</b>

### 3.5 Benchmark of energy usage

It is difficult to benchmark the energy use due to the very high seasonality of space occupancy. The energy usage is considered for the Centre as a whole and also on the basis of the occupied areas.

Energy used for the overall centre:

- 2 988 MWh per annum for 39 000 m<sup>2</sup> = 76 kWh/m<sup>2</sup>/annum.

This low figure is largely due to low utilization periods and hence low energy consumption (many m<sup>2</sup> not drawing power).

For comparison, the energy used per m<sup>2</sup> of occupied are:

- 2 988MWh per annum for 17% utilization of 39 000 m<sup>2</sup> = 447 kWh/m<sup>2</sup>/annum.

## 4. Technical Issues

### 4.1 Metering

The site is supplied via a bulk supply substation to three separate ring mains via five main sub-stations. A full Mains Reticulation Schematic was provided.

The site is well metered for electricity, with numerous sub-meters available. This could enable good tracking of electricity usage, but unfortunately the detailed information is not regularly recorded. (It would be difficult to analyse as the usage is also extremely peaky.)

Each of the Halls is separately metered to enable customers to be charged for units used, and these meters are reset on event build-up, and readings taken after event completion. In general only the reading for the bulk supply meter is taken on a regular basis

DB's and metres are as follows (see also DB and HV distribution diagram):

Energy Survey: NASREC Expo Centre

kWh Meter	Area covered	Description	Note
City-Power Main	Whole site	Bulk supply and max demand	Electro-mechanical meters
Sub 87	Ring main 1: Halls 6,7,8 and Milners Food	Lighting, power points	Supercon meters, reset on event build-up (and monthly for anchor tenants)  Additional meters for lights circuits only!
Sub 90	Ring main 2 (feed A) Halls 9,10 and Delmonts Food		
Sub 45	Ring main 2 (feed B) Hall 5		
Sub AP	Ring main perimeter (feed A) Mast lights, office	Lighting, power points	Readings not taken
Sub MS1	Ring main perimeter (feed B) Mast lights		

All main-meters in sub-stations are fully capable digital power meters (Supercon) capable of measuring peak/off/peak energy consumption, maximum demand, kVAR, etc.

#### 4.2 Building management

There is no automatic building management system in place, and it is uncertain whether it would be worthwhile installing one.

#### 4.3 Load leveling

There is no evidence of specialized load leveling plant to minimize energy demand in the peak demand times, and further it would be unnecessary as the current electricity tariff does not discriminate against specific time-of-use.

#### 4.4 Power factor correction

There is power factor correction plant shown of the HV distribution diagram. This plant was not checked, and further it is currently unnecessary as the current electricity tariff does not discriminate against large reactive power users.

#### 4.5 Air-conditioning

The air-condition plant is small and services only the offices area comprising about 500 m<sup>2</sup> of the total area. It is a non-critical contributor to total energy picture.

#### 4.6 Lighting control

The lighting levels in any of the exhibition spaces cannot be dimmed or varied by adjusting the main lights.

#### 4.7 Load factor

Load factor is a critical issue. Average load factor in any year is 31%, but load factor varies from a poor 17% in off-use months to an absolute maximum of 50% in high use months.

#### 4.8 Back-up generator

There are several 125 kVA gensets distributed around the site at the various sub-station building. These are for emergency back-up only, and are not intended to be able to supply the whole site.

### 5. Estimates of resource utilisation for the WSSD

The period of use of the Centre during the WSSD will be approximately:

Activity	Duration	Period
Build-up and establishment	18 days	01Aug.-18 Aug.
Summit Exhibition	16 days	19 Aug.-04 Sept.
Breakdown	5 days	04 Sept.-09 Sept.
Total	39 days	01 Aug.-09 Sept.

Hours of operation during the WSSD Exhibition period will be:

Daytime: 09h00 - 22h00

For comparison, the Rand Easter Show had a total period of 34 days, and operating hours of 10h00 - 21h00 before complete lights out of the mast-lights at night.

The WSSD and the Rand Easter Show both use all Centre facilities to 100%, so will represent the same level of Centre utilization.

## 5.1 Projection of direct resource consumption

During 39 days of activity and full utilization of the Centre during the WSSD period in late winter/spring, the following consumptions are projected:

### 5.1.1 Electricity

Consumption of 1 170 MWh at 10 c/kWh =	R117 000
Maximum demand of 3 MVA peak demand at R55.49/kVA =	R166 000
Total approximately (excluding VAT)	R283 000

### 5.1.2 H<sub>2</sub>O

Direct consumption of 20 000kl, costing approximately R200 000 excluding VAT. This may, however be sharply revised downwards due to much cooler weather in August for the WSSD than for the March Rand Show, and a higher level of awareness surrounding water usage by WSSD tenants.

## 5.2 Displaceable CO<sub>2</sub> production and H<sub>2</sub>O consumption

- 900 tons of CO<sub>2</sub> produced due to consumption of Eskom generated electricity
- 1415 kl of H<sub>2</sub>O consumed due to consumption of Eskom generated electricity.

Both of these figures can be reduced to nearly zero through supply of the Centre during the WSSD period with Green Electricity sourced from new plant.

## 5.3 Overall direct and indirect consumption

- 900 tons of CO<sub>2</sub> produced
- 21 415 kl of H<sub>2</sub>O consumed in total

## **6. Consumption to be measured during the WSSD**

### **6.1 Access to site**

- There will be full access to site during the summit period.

### **6.2 Time frame**

- Begin 01 August 2002 to 09 September 2002.
- Record daily

### **6.3 Electricity**

- Meter: bulk LV MWh meter
- Readings: MWh consumed and maximum demand.
- Note the meter has a factor of 16000 needed to convert to kWh.

### **6.4 Water**

- Water consumed: from main water meter.
- Fire water: from fire water meter

## **Annexure E. - Energy Survey Report for Sandton Hilton**

# GREEN POWER FOR THE WSSD PROJECT

## ENERGY SURVEY

### SANDTON HILTON HOTEL

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July 2002

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This report is an output of the Green Power for the WSSD Project which is a grant under the South African Department of Environmental Affairs and Tourism (DEAT) climate change program which is supported by the United States Agency for International Development (USAID).

## ACKNOWLEDGEMENTS

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Our specific thanks are due to Mr Mark Hammond and Eva at the Sandton Hilton Hotel.

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## Abbreviations

### General abbreviations

DB	Distribution board
LPG	Liquified petroleum gas
PF	Power factor
LV	Low voltage

### Units

kWh	kilowatt-hour
MWh	megawatt-hour
MJ	megaJoule
kVA	kilovolt-ampere
kV	kilovolt
kW	kilowatt
kl	kilolitre
kg	kilogram
ton	1000 kg

### Conversion factors

1 kWh of electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>.

1 kWh of electricity generated by Eskom consumes 1.21 litres of H<sub>2</sub>O

## 1. Introduction

This energy survey of the Sandton Hilton Hotel (the Hotel) was undertaken as part of the build-up to the World Summit on Sustainable Development (WSSD) to take place in South Africa between 19 August and 4 September 2002. The survey forms part of the Green Power for the WSSD Project to assess the impact of energy demand of the WSSD and to meet this demand with Green Electricity.

The aims of this survey, in order of priority and increasing complexity, are:

- to estimate the demand for energy and resources by the Sandton Hilton Hotel over the summit period
- to estimate the equivalent CO<sub>2</sub>, H<sub>2</sub>O and other produced/consumed under the current energy supply situation, and how this could be offset if the Hotel were supplied with Green Electricity instead
- to bench-mark the Hotel in terms of energy consumption (in comparison with international norms and standards)
- to comment on the energy management set-up within the Hotel, and suggestions for improvements.

A meeting was held on site with the Hotel's Engineering Services Manager – Mark Hammond, on 12 June 2002, when an inspection of the facilities was undertaken and key requirements for information outlined, and again on 02 July 2002. Additional information was forwarded in the following days.

## 2. General Description

### 2.1 Building

The Sandton Hilton Hotel is centrally located in 138 Rivonia Road, Sandton. It is managed, together with the Durban Hilton Hotel, by the Hilton Hotel group in South Africa.

It is one of many five star hotels in Johannesburg, and specifically around Sandton.

The Hotel was built in mid-1998, and is an ultra-modern establishment offering the highest level of facilities. The total number of guest rooms and suites is 327 covering - with additional facilities - a total floor area of about 14 000 m<sup>2</sup>.

The building is split over six main levels, comprising five levels of guest rooms of about 600 m<sup>2</sup> each, with ground floor levels. There are a further two levels for underground basement parking of about 4000 m<sup>2</sup> each. Each of the upper five levels is arranged as in a

Energy Survey: Sandton Hilton Hotel

star shape comprising two perpendicular foyers intersecting at midpoint, to maximize light to each guest room. The lower levels comprise of foyer, banquet rooms, restaurants and offices. There is an atrium above the ground floor foyer, opening up for the full extend to the six floors above. Full details of the building layout are in the plans.

## 2.2 Available spaces

Description	Qty	Total floor area, m <sup>2</sup>	
Foyer	2	938	Ground Level
Bar	4	603	
Offices/staff	1	2 413	
Casino	1	534	
Gym	1	201	Total Ground level: 4 689 m <sup>2</sup>
Banquet halls and committee rooms	5	2 286	Level 1
Restaurant	1	670	
Kitchen	1	1 139	Total level 1: 4 095 m <sup>2</sup>
Atrium (multi-storey)	1	134	Open from 1levels 1-7:
Guest rooms	327	536	Levels 2-6, 536 m <sup>2</sup> floor area each
Service level	1	670	Level 7
Total internal		12 134	Total air-conditioned floor are
Underground parking	2	8 000	2 basement levels, with plant rooms
<b>Grand Total</b>		<b>20 134</b>	

## 2.3 Energy service needs

The main energy services provided in the building are as follows:

Service	Description
Lighting	Electrical illumination and mood lighting throughout the building
General power supply	Offices, conference centers, boardrooms, guest-rooms
Hot water	Electrically heated centralized boilers providing pressure-boosted, balanced hot and cold water for guest-rooms, kitchen and gym.
Air-conditioning	Centralised air-conditioning plant, with centralised chillers and forced air ventilation, for guest-rooms and all public spaces
Space heating	Central water heating, electrically heated, for guest-rooms, and all public spaces
Air ventilation	Centralised mechanical air ventilation for basement parking
Cooking facilities	Gas cookers, plus many electrical cooking appliances
Refrigeration	Walk-in kitchen refrigeration, bar fridges
Special use	Gym, sauna operational 24hrs/day
Lifts and escalators	For Guest use, stores, parking
Fire and protection	Fire and extraction fans

All internal spaces are fully illuminated, serviced and are air-conditioned (12 134 m<sup>2</sup>), with the exception of the underground parking which is ventilated only.

## 2.4 Fuels

95% of the energy needs are provided by electricity. LP gas is used for cooking in the kitchen and comprises about 5% of the total energy picture in terms of energy supply. Stand-by diesel generators contribute insignificantly to the overall energy picture in terms of energy supply.

## 2.5 Occupancy

Average monthly occupancy figures are available for guest rooms only. No figures are available for the number of couverts (meals prepared), or for the usage of conferencing or boardroom facilities.

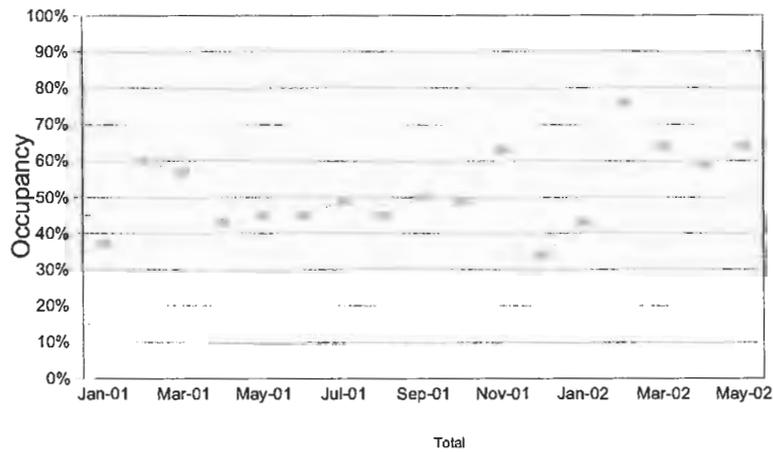


Figure 1: Average monthly occupancy of guest rooms.

### 3. Resource consumption

#### 3.1 Electricity

The average monthly electricity bill is R 91 000, and the average monthly energy consumption is 670 MWh.

The average charge per kWh consumed is 14.0 c/kWh. The average monthly maximum power demand is 1.4 MVA, and average load factor is 66%.

##### 3.1.1 Electricity tariff

The applicable tariff is Eskom’s Miniflex T42 tariff. This is a time-of-use tariff, with a reactive energy charge, but no maximum demand charge. The Eskom electricity supply is limited to 3 MVA.

Applicable tariff charges as of May 2002 are:

Period	Energy charge
Low demand October-June	33.87c / kWh peak time 12.41c / kWh standard time 7.14c / kWh off-peak
High demand July-September	45.80c / kWh peak time 13.80c / kWh standard time 7.90c / kWh off-peak

3.1.2 Electricity trends

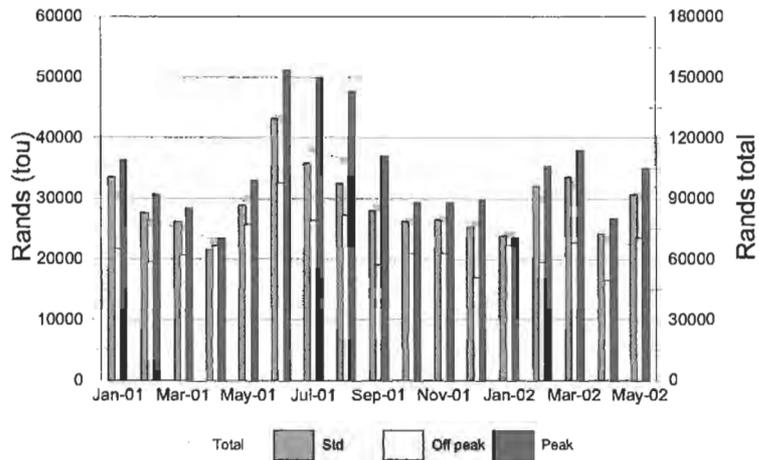


Figure 2: Graph of costs (Rands spent in total) and at the various times-of-use.

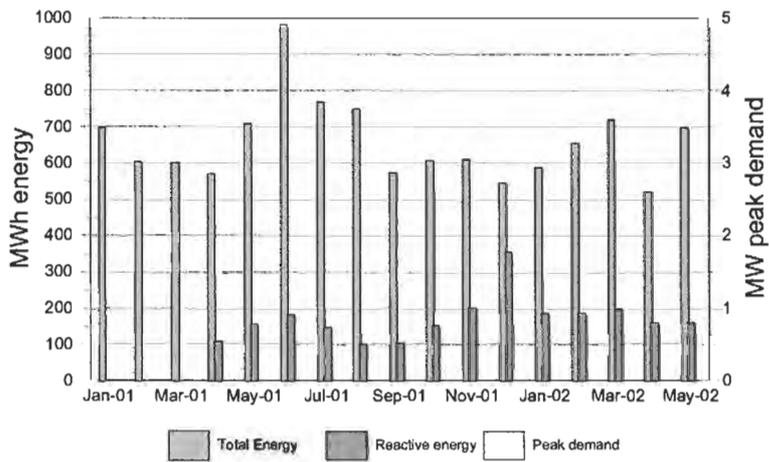


Figure 3: Graph of Energy (total MWh), Reactive Energy (MWh). (Peak demand data is not available)

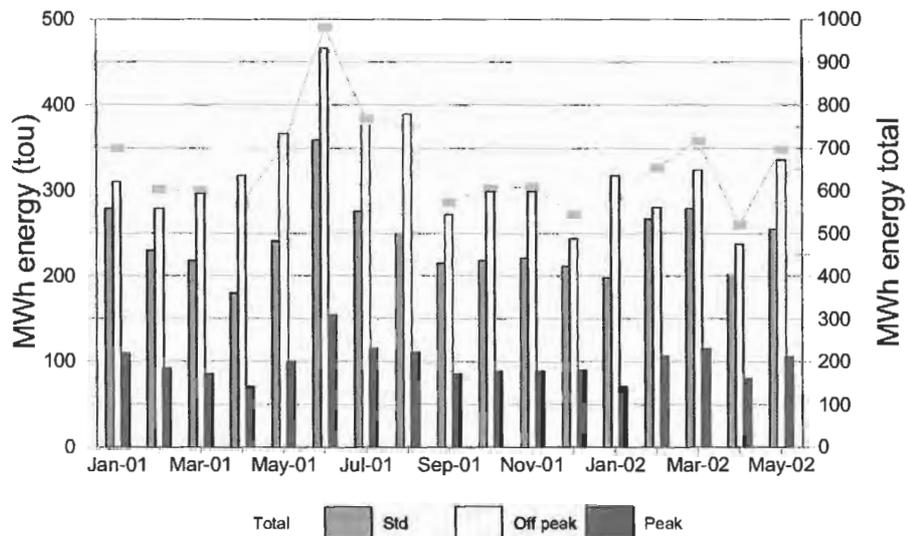


Figure 4: Graph of Energy (total MWh), and energy consumed at the various times-of-use

### 3.1.3 Eskom meter readings versus Hilton meter readings

Hilton Hotel Engineering Services records its own LV meter readings on a daily basis, for the various time-of-use categories: standard energy, off-peak energy and peak energy demand.

Analysis of the Hilton Hotel figures and a comparison with the monthly Eskom bills reveals a discrepancy for the month of July 2001, of about 300 MWh. There is no discrepancy for the other months that cannot be accounted for.

- It is suggested that the Eskom reading for the July 2001 month is unusually high.
- This discrepancy occurred at a time when the Tariff charges changed from 'low demand season' to 'high demand season', and it is likely that the Eskom meter reader performed a manual miscalculation.
- The Eskom readings appear clearly in error.
- It is recommended that the Hotel take steps to recover an amount of approximately R42000 from Eskom.

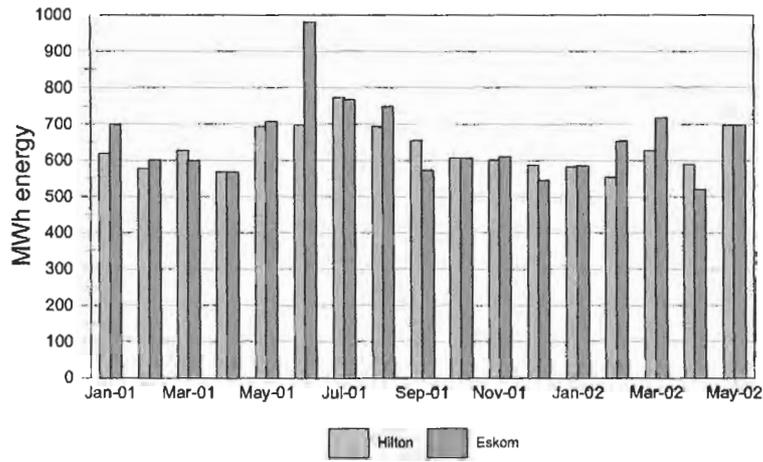


Figure 4: Eskom Energy consumption readings, versus Hilton Hotel meter readings

**3.1.4 Electricity usage by service**

The location of energy meters around the building is sparse, in fact there are is only one LV meter and this is at the bulk supply. It is understood that this level of metering does not comply with normal standards for a hotel within the Hilton Group.

This does not allow dis-aggregation of the energy data by services at all, in any manner other than estimations. However, the instantaneous power drawn was measured and respective proportions as at 12 June 2002 and 02 July 2002 were noted.

Energy Survey: Sandton Hilton Hotel

Service	Instantaneous reading (12 June 2002)	Instantaneous reading (02 July 2002)	Maximum reading	Average % of power
Bedroom lighting & general power. Basement lights. Roof-plant.	300 A	400	600	23%
Aircon chillers, all Aircon plant. Space heating plant. Offices and casino. Kitchen.	600 A	600	1000	39%
Basement ventilation plant. Main hot water boiler. Kitchen, gym, housekeeping, stores. Meeting, boardrooms, ballrooms. Emergency lighting, all lifts, emergency and fire fans.	700 A	500	900	38%

Ideally, proportional energy consumption, rather than instantaneous power consumption, should be measured. It is understood that the Hilton Hotel Engineering Services Manager is installing additional energy meters at strategic locations around the building.

At both times that the power was measured, the air-conditioning plant was off. Hence it can be expected that the proportion due to air-conditioning plant will increase substantially in summer months. These proportions may show substantial seasonal variation, and should be monitored over time to track the trends.

### 3.2 LP Gas

LP Gas is used only for cooking in the kitchen areas, and is supplied in bulk by Afrox at R5.9/kg.

The LPG has a calorific value of about 51 MJ/kg, and therefore the approximate cost of the gas in kWh equivalents is 46.6 c/kWh of energy supplied. This is significantly higher than the average cost of electricity at the Hotel.

About 2600 kg per month is consumed. LPG, as proportion of the total kWh of energy consumed, is 5%, and about 15% of the total energy bill.

Energy Survey: Sandton Hilton Hotel

### 3.3 Water usage

Water is purchased from City of Johannesburg. The average monthly bill is R30 000. the average monthly consumption is 4 600 kl, and the average charge is R7.05/kl.

There was an anomaly in the water consumption figures provided. The bills suggest that the water consumption for the month of April 2002 was 10733 kl, at a cost of R41 204, or rate of R3.8/kl. This kl consumption figure is clearly an outlier. This figure has been corrected to 5 844 kl at a rate of R7.05/kl, equal to the bill charge totaling R41 204.

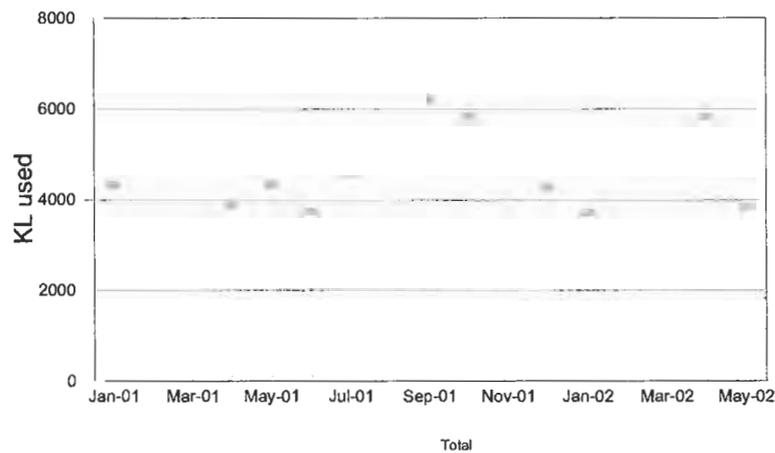


Figure 5: Graph of water consumption trends

A substantial portion of the water may be used for the air-conditioning systems' wet-cooling towers, although this proportion is seasonal. It is suggested that a separate water meter is installed at the feed to the air-conditioning cooling tower plant on the roof.

### 3.4 Comparison with occupancy / seasonality

It is possible to undertake a sensitivity analysis of effect of seasons or utilization on the energy and water consumption data. However, it can be ascertained that there is only a weak correlation between occupancy and water consumption, while the relationship between occupancy and energy consumption is about 100 MWh/month per 30% occupancy. It is clear that other external factors, such as weather conditions, affect building energy consumption.

Energy Survey: Sandton Hilton Hotel

### 3.5 Contribution to CO<sub>2</sub> produced, and total H<sub>2</sub>O consumed

#### 3.5.1 CO<sub>2</sub>

- Electricity generated by Eskom from coal produces 0.77 kg CO<sub>2</sub>/kWh generated.
- LP gas consumption generates 1.52 kg CO<sub>2</sub>/kg consumed.

#### 3.5.2 H<sub>2</sub>O

- Electricity generated by Eskom consumes 1.21 litres/kWh generated.

The overall CO<sub>2</sub> produced and H<sub>2</sub>O consumed as a result of the energy consumption, and general consumption is:

	Summer month		Winter month	
<b>CO<sub>2</sub> production</b>				
Indirect due to: Electricity generation	600 MWh @ 0.77 kg CO <sub>2</sub> /kWh	462 tons	850 MWh @ 0.77 kg CO <sub>2</sub> /kWh	654 tons
Direct due to: LPG	2600 kg @ 1.52 kg CO <sub>2</sub> /kg	3.95 tons	2600 kg @ 1.529 kg CO <sub>2</sub> /kg	3.95 tons
<b>Total CO<sub>2</sub></b>		<b>466 tons</b>		<b>658 tons</b>
<b>Water consumption</b>				
Indirect due to: Electricity generation	600 MWh @ 1.21 l/kWh	726 kl	850 MWh @ 1.251 l/kWh	1 028 kl
Direct due to: Building consumption, including air-con towers		4 100 kl		5 000 kl
<b>Total water</b>		<b>4 826 kl</b>		<b>6 028 kl</b>

### 3.6 Bench mark of energy usage

It is possible to bench the hotel using several methods.

Energy used for the entire hotel:

- 8 040 MWh electrical + 396 MWh per annum LP gas = 8 436 MWh/annum.

Energy used per area of useable space:

- 8 436 MWh per annum for 12 200 m<sup>2</sup> total floor area = 691 kWh/m<sup>2</sup>/annum.

This is generous by South African standards.

Energy Survey: Sandton Hilton Hotel

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Energy used per guest room:

- 8 436 MWh per annum for 327 rooms = 25 000 kWh/room/annum.

This is high by South African standards, but probably applicable to typical 5-star hotels.

## 4. Technical Issues

### 4.1 Metering

A full Mains and DB schematic diagram is available. DB's and meters are as follows:

DB location	Description	Note
Eskom Main	Bulk supply and max demand 11kV	KWh meter
Sub 1	Site main 380 kV	KWh meter
TRX1: SMBIII, IV	Bedroom lighting & general power. Basement lights, Roof-plant.	Require additional energy meters at SMBIII, IV and sub-meters at strategic sub-DB's
TRX2: SMBI	aircon chillers, all aircon plant, space heating. offices and casino. Kitchen.	Require additional energy meter at SMBI and sub-meters at strategic sub-DB's
TRX3 SMBII, Emergency board	Basement ventilation plant, Main hot water boiler, Kitchen, gym, housekeeping, stores, Meeting, boardrooms and ballrooms, Emergency lighting, all lifts, emergency and fire fans.	Require additional energy meters at SMBII and Emergency board, and sub-meters at strategic sub-DB's

The installed LV bulk supply meter is fully capable with digital power meters capable of measuring peak/off/peak energy consumption, maximum demand, kVAh, etc.

The location of energy meters around the building is very sparse (there is only one meter). This does not allow dis-aggregation of the energy data by services at all in an accurate manner. It is understood that this does not comply with normal standards for a building of this nature for this operating group, and that the Hilton Hotel Engineering Services Manager is installing additional energy meters at strategic locations around the building to enable better energy monitoring.

## 4.2 Building management

There is no integrated building management system (BMS) installed. Such a system would ensure that un-utilized or unoccupied areas of the building are not supplied with lighting, air-conditioning services, or mechanical ventilation unnecessarily, and energy savings would ensue. At present even unoccupied rooms are supplied with air-conditioned air.

The cost of a BMS was investigated and estimated at about R1 500 000. Savings per month were estimated at about R40 000. The system would require at least 3.5 years to achieve payback.

At present the energy is managed by several non-integrated systems. While definitely not an optimal solution to energy management, these are nevertheless effective in reducing energy costs.

## 4.3 Load levelling

The load levelling operation on site is essentially energy time-of-use management (in terms of the electricity tariff), and at the hotel is applicable to the main water boilers.

The system comprises: 2 off unpressurized thermal vessels heating water to 95°C at off-peak times, and 2 off 600 kPa pressurized duty vessels heating water to 45°C. When peak hot water demand occurs at within the peak energy demand time zone (in terms of the electricity tariff) then the thermal vessels exchange heat with the water in the duty vessels via 2 off heat-exchangers and heat-exchanger pumps, thus saving peak demand electricity. (no direct mixing of water can occur between the two vessels due the difference in pressure between the thermal and duty cycle water).

At the 12 June 2002 inspection the controls to the thermal tanks had burnt out and the load-levelling plant was not operational. At the time of the second visit the plant had been repaired and was operational, but due to a lack of local energy metering the effect could not be immediately recorded.

## 4.4 Air-conditioning

The air-conditioning plant duty cycle is determined by the air-conditioning load, and the plant controls ensure that the plant is always operating at optimal efficiency, (even though not serving only the necessary areas of the building).

The air-conditioning cooling towers for condensers are wet-type located on the roof, which display a relatively high water consumption, (and seasonally variable, i.e. higher in summer months). The air-conditioning pumps, compressors and ventilation fans are the main contributors to reactive energy demand.

The centralised cooling system to the air-conditioning units consists of 3 off chiller compressors, 3 off chilled water pumps for cycling chilled water around the building, and 3 off condensor water pumps. The operation of the chillers is dependent on the demand

Energy Survey: Sandton Hilton Hotel

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for chilled water throughout the building. Even at full demand only one condenser pumps is operational, but all three chiller units may be running. At partial loads, one or two chillers with their respective chiller pumps may be running (at optimum efficiency), with the other units in standby.

The centralised heating system to the air-conditioning units consists of 1 off electrical water boiler heating water to 95°C, and 1 off boiler water pump for cycling hot water around the building.

The air-conditioning ventilation system comprises fan coil units in each specific location of the building, with its own thermostats.

#### 4.5 Lighting control

There is no central lighting control, and no individual light dimming.

#### 4.6 Power factor correction

According to the Mains Schematic, there is no power-factor (PF) correction system. The average PF over the year is close to 0.90, with a low of 0.80 in summer. However, reactive energy charges are very low and the financial penalty for using reactive energy is less than R3 000 per month, so it is doubtful that the economics will justify the installation of a PF plant.

#### 4.7 Load factor

Average load factor is 66%, which is high.

#### 4.8 Back-up generator

A single 500 kVA diesel generator is installed for emergencies only. It supplies an emergency DB providing power for emergency lighting, all lifts, emergency and fire fans.

### 5. Estimates for the WSSD

The period of use of the Hotel during the WSSD period will be approximately:

Activity	Duration	Period
Preparation and arrivals	2 days	17Aug.-18 Aug.
Summit period	16 days	19 Aug.-04 Sept.
Departures	2 days	04 Sept.-05 Sept.
<b>Total</b>	<b>20 days</b>	<b>17 Aug.-05 Sept.</b>

Energy Survey: Sancton Hilton Hotel

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The hotel is expected to be at full occupancy, and will be fully operational day and night. All meeting rooms and boardrooms will also be fully utilized during the summit period.

## 5.1 Projection of direct resource consumption

The following consumptions are projected during the 20 days of activity and full utilization of the Hotel during the WSSD period in late winter/spring.

### 5.1.1 Electricity

- Baseline: typical August 2002 monthly consumption of 750 MWh, costing approximately R105 000 excluding VAT, (based on the worst month data from the previous year, which occurred in August, at hotel occupancy of 45%)
- Estimated full August-month energy consumption at 100% occupancy is:  
 $750 \text{ MWh} + 100 \text{ MWh}/30\% \times 55\% = 933 \text{ MWh/month}$ .
- 20 day WSSD period estimate at 100% occupancy: **622 MWh** = R93 000 excluding VAT.

### 5.1.2 LP Gas

- Baseline: typical August 2002 monthly consumption of 2500 kg at 45% occupancy.
- Estimated full August-month LP gas consumption, with an allowance of 25% for increased occupancy to 100% = 3 125 kg.
- 20 day WSSD period estimate: **2 083 kg**, costing R12 289 excluding VAT.

### 5.1.3 H<sub>2</sub>O

- Baseline: typical August 2002 monthly consumption of 5000 kl at 45% occupancy.
- Estimated full August-month H<sub>2</sub>O consumption, with a 25% allowance for increased occupancy = 6 250 kl.
- 20 day WSSD period estimate: **4 167 kl**, costing R29 375 excluding VAT.

## 5.2 Displaceable CO<sub>2</sub> and displaceable H<sub>2</sub>O consumption

- **478 tons CO<sub>2</sub>** produced due to demand for 622 MWh of Eskom-generated electricity
- **752 kl H<sub>2</sub>O** consumed due to demand for 622 MWh of Eskom-generated electricity.

Both of these figures can be reduced to nearly zero through supply of the Hotel during the WSSD period with new Green Electricity.

- **4 tons CO<sub>2</sub>** produced due to consumption of 2 083 kg of LP gas, cannot be displaced.

### 5.3 Overall direct and indirect consumption

- **478 tons CO<sub>2</sub>** produced from Electricity demand and LP gas consumption.
- **4 919 kl H<sub>2</sub>O** total consumed directly and indirectly.

## 6. Consumption to be Measured during Summit

### 6.1 Access to site

There will be no access to site during the summit period. Therefore the resource measurers will need to make a specific and explicit requests for information to be taken at specific pre-arranged times.

### 6.2 Time frame

- Begin 17 August 2002 to 05 September 2002.
- Record daily.

### 6.3 Electricity

- meter: bulk LV MWh meter
- readings: MWh consumed, but include details of TOU MWh, PF, Peak demand, reactive power.

### 6.4 LP Gas

- LP gas consumed: estimates only.

### 6.5 Water

- Water consumed: from main water meter.

## **Annexure F. - Preliminary inventory of Green Electricity generation capacity in the southern African region**

Green electricity generation capacity in SA											
Station name	Owner / operator	Location Place	Country	Primary source	Planned capacity MW	Installed capacity MW	Licensed capacity MW	Load factor %	Electricity sent out GWh/annum	Electricity sent out kWh/annum	Status / comments
<b>Solar</b>						<b>0.52454</b>			<b>1.0530</b>	<b>1053014</b>	
1	BP petrol station - Melrose Arch	BP Southern Africa	Johannesburg	South Africa	solar	0.021			0.0422	42158	
2	BP petrol station - Randburg	BP Southern Africa	Johannesburg	South Africa	solar	0.021			0.0422	42158	
3	BP petrol station - Montecasino	BP Southern Africa	Johannesburg	South Africa	solar	0.021			0.0422	42158	
4	BP petrol station - Cato Ridge	BP Southern Africa	Durban	South Africa	solar	0.021			0.0422	42158	
5	BP petrol station - Durban	BP Southern Africa	Durban	South Africa	solar	0.021			0.0422	42158	
6	BP petrol station - Rabie Ridge	BP Southern Africa	Midrand	South Africa	solar	0.021			0.0422	42158	
7	BP petrol station - Benoni	BP Southern Africa	Benoni	South Africa	solar	0.021			0.0422	42158	
8	Moshoeshoe Eco-village	Sol Plaatje Municipality	Kimberley	South Africa	solar	0.0011			0.0022	2208	
9	DBSA/Eskom Stirling Engine	DBSA / Eskom	Midrand	South Africa	solar	0.025			0.0502	50188	not available for WSSD
10	Eskom Northern Cape	Eskom	Northern Cape	South Africa	solar	100					
11	MARVOL PV system	MARVOL	Cape Town	South Africa	solar	0.0018			0.0036	3614	de-commissioned after 10 years
12	GreenHouse Project PV system	Earthlife Africa	Johannesburg	South Africa	solar	0.00207			0.0042	4156	temporary installation; awaiting JCL funding
13	AGAMA Energy PV system	AGAMA Energy	Tokai	South Africa	solar	0.00011			0.0002	221	
14	Gardner PV system	Len Gardner	Noordhoek	South Africa	solar	0.00011			0.0002	221	installed August 2002
15	Shell Renewables - Head Office	Shell Renewables	Midrand	South Africa	solar	0.0008			0.0016	1606	
16	Astropower - Ubuntu Village	Astropower	Johannesburg	South Africa	solar	0.001			0.0020	2008	
17	Willi's Energy Savers	Willi's Energy Savers	Ladybrand	South Africa	solar	0.00015			0.0003	301	
18	Emcon	Emcon	Windhoek	Namibia	solar	0.00025			0.0005	502	
19	Gottlieb Hamutwe		Tsumeb	Namibia	solar	0.00015			0.0003	301	
20	NuRa (off-grid utility)	NuRa	Maputoland	South Africa	solar	0.01			0.0201	20075	
21	Solarvision		Limpopo	South Africa	solar	0.035			0.0703	70263	
22	Shell / Eskom		Eastern Cape	South Africa	solar	0.3			0.6023	602250	
23	Renewable Energy Africa										
24	EDF										
25											
26											
<b>Wind</b>						<b>16.50</b>			<b>43</b>	<b>0</b>	
1	Darling wind farm	Darlipp	Darling	South Africa	wind	13	5.2	5.2	0.3	14	under construction
2	Luderitz wind farm	Nampower	Luderitz	Namibia	wind	20	nil	nil	0.3		licence to be approved
3	Eskom Wind Test Site - Klipheuwel	Eskom	Klipheuwel	South Africa	wind	10	4.3	nil	0.3	11	first 660kW machine t/be installed byWSSD
4	Moshoeshoe Eco-village	Sol Plaatje Municipality	Kimberley	South Africa	wind	0.0008	0.00075		0.3	0.0020	
5	Kouga Energy Company	Kouga Energy Company	Port Elizabeth	South Africa	wind	7	7		0.3	18	in planning phase
6	Offshore options		Australia Costa Rica	wind wind							to be confirmed
<b>Biomass</b>						<b>250</b>			<b>900</b>		
1	Amatikulu	Tongaat Hulett		South Africa	bagasse	10	12	51		44.7	
2	Darnall	Tongaat Hulett		South Africa	bagasse	7	13	44.7		27.4	
3	Felixton	Tongaat Hulett		South Africa	bagasse	22	32	41.5		80.0	
4	Maidstone	Tongaat Hulett		South Africa	bagasse	20	29	45.4		79.5	
5	Komatipoort	Transvaal Suiker	Komatipoort	South Africa	bagasse	20	20	40		70.1	
6	Malelane	Transvaal Suiker	Malelane	South Africa	bagasse	32.4		40		113.5	
7	Pongola	Illovo		South Africa	bagasse	9.2		40		32.2	
8	Umfolozu	Illovo		South Africa	bagasse	16		40		56.1	



## **Annexure G. - The Criteria for Certification of Green Power Generators**

[please use this draft on your letterhead and fax to NER 012 and AGAMA – original by post]

28 July 2002

The Chief Executive Officer  
National Electricity Regulator  
P O Box 40343  
Arcadia  
0007  
South Africa

Attention: Dr Xolani Mkhwanazi

Dear Dr Mkhwanazi

### APPLICATION FOR TEMPORARY REGISTRATION AS A GREEN POWER GENERATOR

I hereby apply to the National Electricity Regulator for temporary registration of the following facility as a green power generator. I submit this application in terms of the overall goals and operational framework of the Green Power for WSSD Project.

Name of facility:		
Registered owner:		
Location:		
Primary energy source:		
Auxiliary energy sources (if any):		
Electricity conversion system:		
Rated generation capacity:		KVA
		MVA
Proportion of electricity generated from the primary renewable energy source:		%
Average capacity factor:		%
Predicted average monthly green electricity production: (excluding non-renewable auxiliary energy sources)		kWh/month
		MWh/month
Meter description:		
Licensed supply authority in area of operation:		
Date of commissioning:		

I understand that this registration has no binding legal effect and that the registration is valid only for the duration of the Green Power for WSSD Project which ends on 30<sup>th</sup> November 2002.

Tradeable Renewable Energy Certificates acquired during the project will be made available for purchase by City Power to back up Green Electricity sales to the participating WSSD venues. I understand that City Power, on behalf of the project, is not obliged to buy any or all of the acquired TREC's but that the intention is to back-up the green electricity sales to the venues with a representative mix of green generation capacity.

I appreciate the opportunity to participate in the project and look forward to your response.

Yours sincerely

.....  
Signed

.....  
Printed name

.....  
Position

.....  
Date

## **Annexure J. - Development of a Green Electricity Tariff for the main venues of the WSSD**

# DEVELOPMENT OF A GREEN ELECTRICITY TARIFF FOR THE MAIN VENUES OF THE WSSD

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July 2002

**Prepared by:** Charles Dingley, University of Cape Town

This report is an output of the Green Power for WSSD Project which is a grant under the South African Department of Environmental Affairs and Tourism (DEAT) climate change program which is supported by the United States Agency for International Development (USAID).

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## 1. Introduction

The purpose of this document is to set out the assumptions and calculations underlying a proposed tariff for the supply of green electricity to various venues hosting the World Summit on Sustainable Development (WSSD) due to take place in Johannesburg this August.

The development of this tariff should be viewed in the following context:

- The supply of green electricity to WSSD venues is part of the 'Greening of the Summit' initiative of the WSSD organisers.
- Supplying green electricity to the WSSD is seen as the start of a long-term process of making green electricity available to all South African consumers, at first on a voluntary basis, and in the longer term on a mandatory basis (as in Australia, the UK and Germany, for example).
- This exercise therefore has a strong PR component, and to keep it simple for public consumption, the green electricity tariff developed here will be a simple single-rate energy tariff.
- The level of this tariff is unavoidably likely to be higher than normal commercially available tariffs.
- Payment of this tariff by the venues concerned to their suppliers will be on a voluntary basis, and will replace their normal tariff.
- There is no significant experience as yet in South Africa in the operation of green electricity generating facilities on anything but a small scale, and therefore no first-hand detailed knowledge of the costs involved.

Given that context, the aim here is to develop a tariff that is cost-reflective, even if it is not precise to the last cent. In other words, the aim is to arrive at a tariff that can be shown with some confidence to be in the right ballpark.

## 2. Methodology

An important question - to which there is no easy answer - is which technology (or technologies) should serve as a basis for this tariff. After some discussion, the project team agreed that in view of the large amount of wind generation capacity being installed at present internationally (including some 10 MW in this country over the next few months), that technology should be used as the tariff benchmark. (Thousands of photovoltaic panels are being installed in South Africa, but as these are almost all very small and off-grid, it was decided not to take them into account in these calculations.)

Development of a green electricity tariff for the main WSSD venues

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The approach taken in the following calculations is to determine at what rate (in cents per kWh or 'unit' of electricity) an investment in wind generation will produce a given required return. This is based on using discount rates that are net of inflation, which implies that both the tariff and the return on investment are assumed to increase equally with inflation.

Three scenarios will be developed: (1) a lower bound scenario; (2) an upper bound scenario; and (3) a scenario that presents an informed estimate.

While the detailed assumptions incorporated into these calculations can all no doubt validly be questioned, it should be borne in mind that the aim is to arrive at a reasonably robust ballpark tariff to serve a specific purpose.

## 2.1 Assumptions

These following assumptions will be made:

Capital cost of wind generation per MW installed	\$1.0 to 1.2 million
Capacity factor	30 to 35%
Maintenance and operation (estimate)	2% of capital cost p.a.
Rand - dollar exchange rate	\$1 = R10 to 11
Required return:	
Public project	IRR 8% over 25 years
Private project	IRR 10% over 15 years (both net of inflation)

## 2.2 Scenario 1 - Lower bound

Capital cost per MW (\$1.0 million at \$1 = R10)	R10 million
Required return per MW to repay capital (For IRR of 8% over 25 years)	R937 000 p.a.
Maintenance and operation (Estimated at 2% of capital cost)	R200 000 p.a.
Total required return	R1.137 million p.a.
Annual output (at 35% capacity factor)	3066 MWh
Required generation tariff	R371/MWh or 37 c/kWh

Development of a green electricity tariff for the main WSSD venues

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For large users T&D costs (estimate)	10 c/kWh
Total tariff	47 c/kWh

For small users T&D costs (estimate)	15 c/kWh
Total tariff	52 c/kWh

### 2.3 Scenario 2 - Upper bound

Capital cost per MW	R13.2 million
(\$1.2 million at \$1 = R11)	
Required return per MW to repay capital	R1 735 000 p.a.
(For IRR of 10% over 15 years)	
Maintenance cost	R200 000 p.a.
(as for Scenario 1)	
Total required return	R1.935 million p.a.
Annual output (at 30% capacity factor)	2628 MWh
Required generation tariff	R736/MWh or 74 c/kWh
For large users T&D costs (estimate)	10 c/kWh
Total tariff	84 c/kWh
For small users T&D costs (estimate)	15 c/kWh
Total tariff	89 c/kWh

### 2.4 Scenario 3 - An attempt at an informed estimate

Capital cost per MW	\$1.2 million
(This higher figure is derived from international data given to the project team.)	

Development of a green electricity tariff for the main WSSD venues

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But an estimated 40% of this will be local content, which can be taken at a R/\$ purchasing power parity of \$1 = R3. The balance of 60% will be assumed to be imported at imported at \$1 = R11. Therefore:

Actual capital cost per MW R9.36 million

(This is in line with Eskom's estimates of about R10m per MW for Klipheuwel. This figure should decrease slightly for future installations, as South Africa becomes able to benefit further from increased local content.)

Power projects are normally amortised over longish periods, so 25 years for plant of this kind seems reasonable. An 8% IRR is perhaps on the high side for public sector projects, while acceptance of 8% for private sector projects would depend on the commercial arrangements. As a compromise between the two, 8% will be used here.

Required return per MW to repay capital R877 000 p.a.

Maintenance (as for Scenarios 1 and 2) R200 000 p.a.

Total required return R1.077 million p.a.

Annual output is obviously site dependent. Given that wind conditions in SA are generally not as good as in Europe (for example), it would be prudent to use a capacity factor of 30%.

Annual output 2628 MWh

Required generation tariff R410/MWh  
or 41 c/kWh

For large users T&D costs (estimate) 10 c/kWh

Total tariff 51 c/kWh

For small users T&D premium (estimate) 15 c/kWh

Total tariff 56 c/kWh

### 3. Conclusion

In the interests of simplicity, we will opt for a single-rate tariff of 50 c/kWh for WSSD venues. (VAT is generally not an issue for large users, as they would be able to reclaim it, but it would affect householders.)

Development of a green electricity tariff for the main WSSD venues

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According to a recent article in African Energy (issue 4(2)), the proposed wind-farm at Darling will need to sell its output at 33 c/kWh to give shareholders an 8% IRR (period not stated). This could be optimistic, but it does suggest that the required generation tariff derived here is not too low.

The green electricity premium in Australia is 4 Aus c/kWh, or about 25 SA c/kWh, and in the UK 3 p/kWh, or about 45 SA c/kWh. Using the mid-point of these two, that is, a premium of 35 c/kWh, produces the following:

- Large users: 15 (average SA large-user price) + 35 = 50 c/kWh.
- Small users: 35 (average SA domestic tariff) + 35 = 70 c/kWh (but bear in mind that domestic tariffs in South Africa commonly include a municipal 'tax').

These comparisons suggest that a tariff of 50 c/kWh can be used with some confidence for the supply of green electricity to WSSD venues.

## **Annexure I. - A Draft Regulatory and Trading Framework for a Green Electricity Market in South Africa**

# A DRAFT REGULATORY AND TRADING FRAMEWORK FOR A GREEN ELECTRICITY MARKET IN SOUTH AFRICA

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July 2002

**Prepared by:** Charles Dingley, University of Cape Town

This report is an output of the Green Power for WSSD Project which is a grant under the South African Department of Environmental Affairs and Tourism (DEAT) climate change program which is supported by the United States Agency for International Development (USAID).

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## 1. Introduction

The purpose of this document is to set out ideas on the design of voluntary and mandatory mechanisms for funding the development of electricity generation facilities in South Africa that have a low environmental impact, particularly with regard to carbon dioxide emissions. The short-term aim is to draw up and obtain agreement from likely participants on proposals for supplying green electricity to the main venues hosting the World Summit on Sustainable Development (WSSD) in Johannesburg this August. This will have important symbolic value for the Summit and for the promotion of public awareness of green energy issues in South Africa and elsewhere. In addition, it is hoped that this document might contribute to the design of longer-term mandatory measures similar in purpose to those adopted by various countries in line with the objectives of the Kyoto Protocol. To that end, this document reviews green electricity certificate systems used elsewhere. (Note that some countries have introduced mandatory measures despite not having as yet ratified the Kyoto Protocol.)

Electricity production in South Africa results in the emission into the atmosphere of some 170 million tons of carbon dioxide annually [1], and the past couple of decades have seen small, but growing and increasingly influential, pockets of support for electricity generation based on the use of green energy resources. Until a few years ago, there was generally little support for the implementation of these ideas either from government, because of other pressing priorities, or from the electricity supply industry (ESI), because of the country's considerable surplus of conventional (mainly coal-fired) generating capacity.

But more recently, in the context of the Kyoto Protocol and the support of the present government - as set out in its Energy White Paper - opinion has shifted significantly. South Africa's hosting of the World Summit on Sustainable Development (WSSD) in August 2002 will focus attention on what the country is doing in this regard. Even though South Africa does not have the same obligations under the Kyoto Protocol as other more developed countries, there is support within government and the ESI for making a start now on the development of our green energy resources. This is manifesting itself, for example, in wind power projects currently underway at Klipheuwel and Darling in the Western Cape.

Green electricity generation in general offers the advantages of a low environmental impact and low running costs, but often with the concomitant drawbacks of high capital costs and an output dependent on unpredictable energy sources such as wind or sunshine. For use in small off-grid applications, the cost of green electricity generation may be justified by the high value of applications such as lighting and refrigeration, and battery storage of small quantities of electricity is a feasible way of overcoming the erratic nature of the energy source.

But where green power is considered for large-scale generation, these issues take on a different significance. Operational problems related to the unpredictable nature of wind power, for example, may be mitigated if there are several such facilities connected to the grid in different parts of the country, or if their output can be balanced against that of hydro or pumped storage stations. But as the level of green electricity generation grows beyond that, new operational techniques may be needed in integrating green stations into a national grid. In the South African context, however, given the extent of Eskom's conventional generating capacity, this need is unlikely to arise for some time. (Reportedly, the consensus in the UK is that new operational techniques may be required when generation from renewable sources reaches 10% of system capacity, and certainly would be required at the 20% level.)

The more severe constraint worldwide on the large-scale development of green power generation is its initial capital cost. Despite the low running cost of, say, a small hydro station or a wind-farm, provision for the recovery of the capital cost (and possibly for a profit margin) generally requires tariffs that are not competitive with prevailing electricity prices. That is especially so in South Africa, as our power stations are largely paid for and coal is cheap. The officially set premium on the bulk price of green electricity in Australia is 4 cents a unit (kWh), equivalent at the current exchange rate to over 20 SA cents, and approximately equal to the average wholesale price of electricity in Australia. The UK premium is somewhat higher, at 3 pence a unit, equivalent to over 40 SA cents. (These premium levels are set by the level of the legislated penalty that is imposed on suppliers who have shortfalls in their green electricity quotas.)

Given the low cost of electricity generation in South Africa (of just under 12 cents a unit in 2001 [1]), a green electricity premium sufficient to attract new investment in green generation would almost certainly need to be even higher than Eskom's average price of 14 c/kWh [1]. New generating capacity will be needed in the second half of this decade, when South Africa's surplus capacity has been taken up. The cost of electricity is then predicted to rise sharply, as the capital cost of new plant (in Rand terms) will be several times higher than the cost in the 1980s and 1990s when most of Eskom's existing power stations were built.

It is because of this gap between the cost of electricity generated in conventional stations and of that generated using green energy resources, that there is a need for special funding mechanisms. The international trend appears to be towards systems based on tradable green electricity certificates, and this report follows that trend. There are other possible approaches, such as the imposition of a 'carbon tax' on processes that emit carbon dioxide, but that debate is beyond the scope of this work.

Two short sections containing explanatory material are followed by an overview of green certificate systems in certain other countries, leading to a discussion of some ideas on how we might proceed in South Africa.

## 2. Considerations in selling green electricity across a grid

An appreciation of a number of commercial and technical issues may assist in an understanding of the rationale behind green certificate systems.

Perhaps the most important of these considerations is that in a power grid fed by multiple power stations, it is impossible to identify the origin of the electricity reaching a particular customer. The electrons received by a particular customer will be a mixture of electrons from all the generating stations on the grid. Therefore, the idea of 'buying' green power is not literally true. Rather, by paying a green electricity premium, a user is helping to ensure that generating companies continue to invest in green generation (that is, while such a premium remains a necessary incentive).

Secondly, because of the erratic output of many green generation facilities (such as wind generators), it is conceptually useful to de-couple the instantaneous output of such a station from the instantaneous needs of the customers who are 'buying' that station's output. In other words, the two processes need not be synchronous. It is more convenient, but still quite valid, rather to match the aggregate output of the station (or of all the green stations on a grid) with the aggregate consumption of all the customers buying green electricity from that station or grid. To take account of seasonal factors, the aggregation may be done over a period as long as a year.

Commercial arrangements for transporting electricity from a green station to its end-users would be complicated. As explained earlier, this is in any case only notional, as there can be no guarantee in an integrated grid of the origins the electrons. But as it happens, green stations are often on the periphery of a network (coastal wind generation, for example), so that their input to the grid has the effect of decreasing the flow of electricity that would otherwise be required outwards from more centrally situated stations. This decreases the extent and cost of losses on the grid, and may delay the need for grid reinforcement in those areas. It is estimated, for example, that the overall reduction in grid transport costs brought about by green generation in Australia will be of the order of A\$100 million by 2010 [2], which is approximately equivalent to 1 Australian cent (5 South African cents) per unit of renewable energy generation. (This figure appears to be higher than it would be within the context of South African cost structures.)

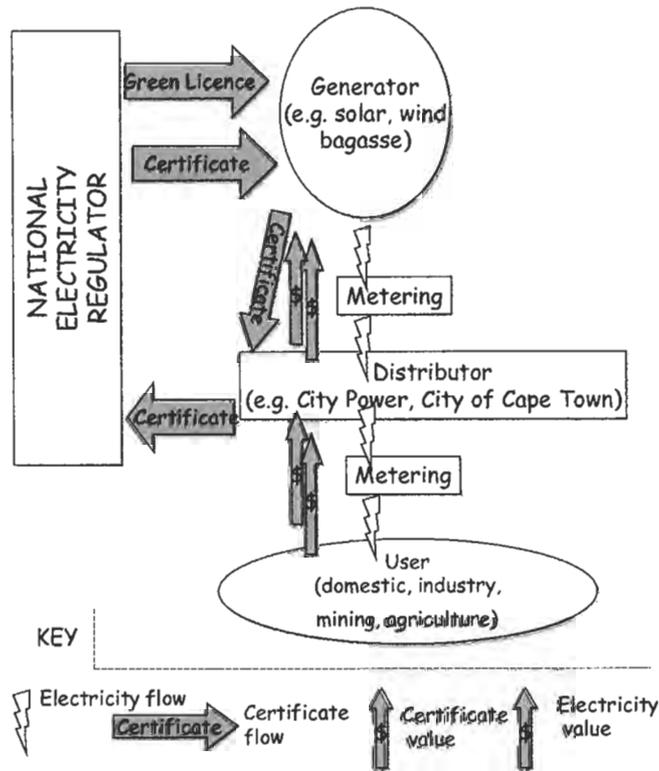
But notwithstanding the probable decrease in total grid costs in the initial stages of a green electricity generation programme, it should be noted that this may change as the number and size of green generating stations increase, especially where local needs can no longer absorb the new generation. An example is the planned 180 MW wind farm on the remote western coastline of Victoria in Australia. Transporting this amount of power to where it can be absorbed into the grid will almost certainly require new transmission capacity that could add perhaps 10% to the

cost of the project (for example, a dual-circuit 132 kV line costing several hundred thousand Rand per km).

Because of the initial decrease in grid costs, it is therefore at present generally the practice to ignore the transport aspects of green electricity transactions. The complexity and overhead of having to conclude transport agreements for green electricity transactions would impede the development of green electricity. A common approach, therefore, is simply to regard the grid as a pool with zero transport cost. Green generating stations earn certificates for their output, and these are then sold to electricity retailers or directly to end-users.

The diagram shows a simplified representation of the flow of electricity, certificates and payments in a system based on tradable green electricity certificates.

### Certification and Trading of Green Electricity



### 3. Terminology: green or renewable?

It is a common practice internationally to use the terms 'renewable' and 'green' somewhat interchangeably. For example, although the relevant legislation in both Australia and the UK uses 'renewable', electricity retailers (suppliers) show a strong preference for 'green' in their promotional material. This is a side issue, but it might be worthwhile including a brief discussion here on which term to adopt in South Africa.

In practice, both terms refer broadly to the same set of technologies, but they differ significantly in origin and focus. The term 'renewable' reflects concerns about our energy resources running out,

whereas 'green' reflects environmental concerns. But there is somewhat less debate over the definition of 'renewable' than over the definition of 'green' (for example, in the case of large hydro stations). According to one source, the lack of a universally agreed definition for 'green' is the reason, in the US at least, for the continued use of 'renewable' [3].

In the case of South Africa, there are enough cheap conventional energy resources (notably coal) to last perhaps a century or two, so the development of 'renewable' resources (in the strict sense of the word) will not be a priority for a long time. But for very different reasons, the government has indicated its support for the development of 'green' electricity generation, and in the South African context, 'green' therefore seems semantically more appropriate, in English at least.

It is beyond the scope of this work, but this question should also be looked at from the point of view of communicating these ideas in all the languages of South Africa.

## **4. A review of green certificate systems elsewhere**

### **4.1 Australia**

#### **4.1.1 The mandatory system**

The Australian government's aim is that by 2010 the country should generate 9500 GWh (millions of kWh) a year from renewable sources developed since 1997 (enough to meet the needs of about a million households). To help achieve this target, the federal government passed the Renewable Energy (Electricity) Act in 2000. The preamble states that it is "An Act for the establishment and administration of a scheme to encourage additional electricity generation from renewable energy sources".

The Act obliges wholesale purchasers of electricity (in practice mainly retailers) to include in their electricity purchases a percentage of green electricity related to national targets. These targets are 300 GWh in 2001, rising to 9500 GWh in 2010, and remaining at that level until 2020 (subject to review).

To de-couple generation of green electricity from its consumption, the Act provides for a system of 'renewable energy certificates' (RECs) as trading instruments between generators and wholesale purchasers. REC obligations are met on an annual basis, with allowance for small shortages and for banking of surplus certificates. The penalty for uncorrected shortages is set at A\$40 per MWh, equivalent to 4 cents per kWh, which sets an upper bound on the sales price of RECs. The generators thus have two income streams, from the sale of RECs and from the sale of energy at the market price. The additional annual cost to customers by 2010 is estimated at A\$460 million [2], leading to an increase to the end-user of some 2.5%. Estimated annual

savings in transmission costs in 2010 due to the distributed nature of this green generation are A\$100 million, giving a net national cost of A\$360 million.

Electricity supply in Australia is a state matter, notwithstanding the development of the National Electricity Market (NEM), and each state has its own regulatory arrangements. At the national level (particularly in relation to the operation of the NEM), users' interests are looked after by the Australian Competition and Consumer Commission. To oversee the operation of the renewable energy scheme, the Act therefore set up the Office of the Renewable Energy Regulator (ORER), based in Canberra.

The Act lists 23 eligible renewable energy sources. ORER accredits and registers eligible generators, and receives their annual statements of eligible electricity generated. ORER has set up a web-based register of 'Renewable energy certificates' (RECs). The generators themselves enter the claimed RECs directly into the on-line register (one for each MWh). The information contained in the REC includes the identification of the station owner and the station, and the date and time of generation. The website holding the REC register includes provision for on-line trading of RECs. This made Australia 'the first country in the world to create a national renewable energy market using tradeable certificates' [4].

The Act allows RECs to be claimed for new domestic and commercial solar water heaters. ORER regulations list the eligible models (about 200 at present) and the number of RECs that may be claimed in each of four climatic zones. This number of RECs is based on an estimated displacement of conventionally generated electricity over the life-span on the appliance. A domestic installation would typically be eligible for 20 RECs, which provides an effective discount of up to A\$800, or R4000.

Wholesale purchasers of electricity generally fulfil their REC quota by way of either bilateral contracts with generators or the market mechanism set up by ORER. Some also generate green electricity themselves.

The penalty of \$40 per MWh mentioned above represents an effective upper bound on the price of RECs. The target for the first period covered by the new legislation, from April to December 2001, was 300 GWh. Slightly over double that was achieved. Because surpluses are carried over, optimism regarding meeting the 2002 target of 1100 GWh has reduced the current REC price to around \$35, but this is predicted to return to the \$40 level as the slack is taken up by further increases in annual targets.

As mentioned in Section 1, the Australian premium (equivalent to about 20 South African cents per kWh) is set at about half the UK level. Some of this difference may be accounted for by other factors (such as the non-alignment between exchange rates and purchasing power of the two currencies), but nonetheless it would seem that the premium may need to be increased to ensure continued investment in green generation. A report by one group of consultants [5], based on a

survey among market participants, suggests that the current premium is "insufficient to stimulate the level of investment required" to meet the targets, and that there are likely to be REC shortfalls over the period 2005 to 2010. A model developed by another group [2] uses a REC price of \$57 for its 2010 base case (about 30 SA cents per kWh).

In summary, the Renewable Energy (Electricity) Act of 2000 imposes a market-driven 'tax' on electricity consumption to finance the difference in cost between conventional and green electricity generation. The regulatory and administrative mechanisms seem efficient, and no adverse reports on their operation have come to this author's notice. The initial level of the REC penalty is sufficient now, but it may need to be raised once the best sites have been developed.

Although the Act gives generous credit for the installation of solar water heaters, it does not give recognition to other forms of energy conservation. This appears to be a shortcoming that would be worth looking at if similar legislation were to be framed in South Africa. For example, a 12000-hour 20-watt compact fluorescent lamp costing perhaps R100 consumes about 1 MWh less over its life (of perhaps 12 years) than a series of 100-watt incandescent lamps with an equivalent light output. The cost of the CFL is half the Australian renewable energy premium of A\$40 (about R200) per MWh.

#### **4.1.2 The voluntary system**

This scheme pre-dates the mandatory scheme described above, but still operates in parallel with it. It was set up some years ago, and is promoted mainly through agencies such as the Sustainable Energy Authority of Victoria and the Sustainable Energy Development Authority of New South Wales, small state-financed bodies that also undertake activities such as giving advice on domestic heat insulation. Under this scheme, electricity retailers market various green 'products' in the form of tariffs that include a voluntary premium for green electricity, often with the option of different premiums for various percentages of green electricity in the user's mix. For example, the normal domestic tariff offered by Citipower (a privately owned retailer serving Melbourne) is 14 (Australian) cents a unit. But for an additional 4 cents a unit, a householder can choose the 'Green Power' option, a 100% green product. This premium is added to the customer's bill.

The voluntary scheme is thus one in which certain customers will voluntarily pay an additional 'tax' over and above that already incorporated into the tariff to pay for the mandatory REC acquisitions. Up-to-date figures are hard to find, but there are apparently some 70 000 Australian households paying a voluntary green premium. If on average this premium is of the order of R25 a month, it would convert to about 100 GWh a year, equivalent to a third of the 2001 national mandatory target of 300 GWh.

## 4.2 The European Union

The current European Union position is set out in its September 2001 Directive [6] 'on the promotion of electricity produced from renewable energy sources in the internal electricity market'.

Perhaps the most important aspect of the Directive is that it sets 'indicative' targets for Member States for the contribution of electricity produced from renewable energy sources by 2010. These targets range from 6% in Belgium and Luxembourg to 78% in Austria (reflecting the availability of hydropower in that country), with an overall average across the EU of 22%. These targets appear to include existing renewable sources.

Different countries within the EU use different financial support mechanisms for green electricity generation, the main two being green certificates (as in the UK) and guaranteed prices (as in Germany). Because of this, the EU has not at this stage attempted to set out a standard approach, but in terms of Article 4(2) of the Directive, the Commission will report in 2005 on 'experience gained with the application and coexistence of the different mechanisms' [6].

Another important issue being addressed within the EU is uniformity in the definition of eligible renewable energy sources across all Member States. That would open the way to REC trading among member states. Renewables investment would in that way be attracted to the most suitable locations.

## 4.3 The UK

The Renewables Obligation Order (Statutory Instrument 2002 No. 914) came into effect on 1 April 2002, to be administered by the existing gas and electricity regulator (Ofgem). Its intent and operation are similar to the Australian mandatory scheme, and so the emphasis here will mostly be on the difference between the two.

The UK targets are considerably higher. Whereas the Australian target of 9500 GWh in 2010 will represent some 5% of electricity consumption, the UK target starts at 3% in the current year (1 April 2002 to 31 March 2003) and increases to 10.4% by 31 March 2011. (This is slightly more than the 10% target set for 2010 by the EU [6].) It will remain in force at that level until 2027 (always subject to review). According to Smith and Watson [7], 'the 10 per cent target implies at least 37.1 TWh of electricity by 2010'. (37.1 TWh = 37 100 GWh.) Smith and Watson regard this target as 'ambitious' [7]. It is about four times the 2010 Australian figure, and in terms of wind generation (for example) it would require some 12 000 MW of capacity costing around R100 billion at current prices.

As in Australia, the legal obligation rests with the retailer. The UK penalty (the so-called 'buy-out price') for shortfalls is 30 pounds per MWh (or 3 pence per kWh), as against the prevailing wholesale market price of about 18 pounds per MWh. The penalty will be increased annually in

line with the retail price index. As noted previously, the UK penalty is set at about twice the Australian level.

The amounts received by way of penalty will each year be put into a 'buy-out fund' that will then be re-distributed to suppliers in proportion to the number of 'renewables obligation certificates' (ROCs) that each has surrendered to Ofgem in respect of each year. This leads to some interesting conjecture: if for example each supplier met (say) 40% of its obligation, then each supplier would receive from the buy-out fund exactly what it paid in. But there would be an incentive to suppliers to buy more ROCs, as each additional ROC that a supplier produced would attract a significant amount of redistributed buy-out money. But this incentive weakens considerably as the total number of ROCs bought approaches the total obligation. (An analysis by this author suggests that the incentive could in certain conditions even become negative.)

Smith and Watson [7] discuss four factors that could inhibit growth in green electricity generating capacity in the UK:

- (i) Obtaining planning permission, particularly for wind generation projects, can be a difficult and lengthy process.
- (ii) The structure of the reformed electricity trading market (the so-called 'New Electricity Trading Arrangements') is widely seen as being a serious problem. Some 98% of sales through NETA are by of bilateral contracts, which implies an 'in-built preference for predictable sources of energy'. Excess generation when the market is 'long' can at times even incur a charge to the generator.
- (iii) The need for revised network charging structures that recognise the value of distributed generation.
- (iv) The lack of support in the ROC structure given to technologies that are promising but still not competitive with technologies such as wind power.

The UK government believes that the UK green energy market will be worth one billion pounds a year by 2010. Even though the legislation as it stands recognises green electricity generated only within the UK, the government is actively 'exploring the possibility of bilateral agreements' that 'could lead to trading of internationally agreed green energy certificates across borders' [8].

As in Australia, UK retailers also offer a range of voluntary green power products. Seeboard 'Green Fund Tariff' customers, for example, pay an extra 0.5 pence (or about 10%) a unit. This goes to a 'Green Fund Trust' that allocates the money to renewable energy projects. Ofgem [9] has set out a number of features that they 'would expect to see in electricity suppliers' marketing of their green supply offerings'. They are transparency; additionality (meaning that energy purchased as part of a supplier's mandatory renewables obligation should not be included in a green supply offering); and verification (meaning that suppliers' claims regarding the use of voluntary green premiums should be openly verifiable). In this last respect, Ofgem suggests that

the holding of ROCs beyond the mandatory requirement, and equivalent to the green premiums received, would be a 'publicly acceptable mechanism'. The dangers of malpractice are also referred in the report by the Center for Resource Solutions, who say that 'The likelihood of fraud in marketing such a nebulous product [as a renewable energy certificate] is very high' [3].

#### 4.4 Germany

As mentioned earlier, green electricity generation in Germany is supported by a system of fixed prices for green electricity (as opposed to a premium paid over and above the prevailing market price, as in Australia and the UK).

The Renewable Energy Sources Act lays down that 'grid operators' shall be obliged to connect eligible electricity generation sources to their grid, to purchase the available electricity from these installations 'as a priority', and to pay for this electricity according to prices specified in the Act. These guaranteed payments are applicable for 20 years.

The Act distinguishes between various energy sources, so as to give government more flexibility in its policy on promoting the use of renewables. The minimum prices to be paid are as follows. (At the prevailing exchange rate is 1 pfennig is equivalent to just under 5 South African cents.)

- (i) For installations under 5 MW where electricity is produced from hydropower, or from gas from landfills, mines or sewage treatment plants: 15 pfennigs per kWh, decreasing to 13 for output at above 500 kW.
- (ii) For installations under 20 MW where electricity is produced from biomass (plant or animal matter): 20 pfennigs per kWh up to 500 kWh, 18 up to 5 MW, and 17 above that.
- (iii) Geothermal: 17.5 pfennigs per kWh up to 20 MW and 14 above that.
- (iv) Wind energy: 17.8 pfennigs per kWh for the first five years. Thereafter prices are determined according to a complicated formula related to output. For new future installations, the specified prices will be decreased by 1.5% annually as from the beginning of 2002. (Prices will thus drop by 14% in 10 years.)
- (v) Solar energy: 99 pfennigs per kWh, dropping by 5% per annum for installations made after the beginning of 2002. (Prices will thus drop by 39% in 10 years.)

Given the level and the long-term nature of these payments, this Act has not surprisingly given an enormous boost to the renewable energy industry, and to the potential for exports. Some 75 MW of photovoltaic generation and 2600 MW of wind power was reportedly installed in Germany in 2001 alone.

## 4.5 The USA

The promotion of green electricity generation in the USA is at present on a voluntary basis. According to Ecofys B.V. [10], 'In the United States, green pricing programs have existed since 1993. Dozens of regulated utilities offer a variety of options to 'buy' additional green energy. Typically, 1 to 3% of their customers sign up for such a program. Many programs are limited and have customer waiting lists.'

The website of the Energy Efficiency and Renewable Energy Network (EREN) of the US Department of Energy [11] lists about 100 utility green pricing programmes or products. The Sacramento Municipal Utility District (SMUD) in San Francisco, for example, has three offerings. For \$6 a month, SMUD will match a customer's monthly usage with purchased green electricity, and for \$3 a month SMUD will match 50% of usage. And through the Community Solar scheme, customers can contribute a premium of 1 cent per kWh towards the installation of photovoltaics at community facilities. Another municipal utility (Cedar Falls Utilities in Iowa) offers its customers the option of contributing \$2.50 a month towards the operation and maintenance of three 750-kW wind generators co-owned by seven Iowa municipal utilities. In the rural electric cooperative sector, Santee Cooper in South Carolina, for example, offers electricity generated from landfill gas at a premium of 3 cents per kWh. The utilities on this EREN list of participating utilities appear to be mostly in the public sector or rural cooperatives, but there may well be many private sector suppliers offering green products that are not listed. Electricity users whose supplier does not offer a green product may alternatively buy green certificates (also known as green tags) directly from a number of 'Green Energy Certificate Marketers', such as the Bonneville Environmental Foundation or the Connecticut Energy Cooperative.

## 5. Options for the financial support of green electricity in South Africa

Options for introducing a green electricity generation support scheme are at present limited by the particular circumstances of the country's economy and the electricity industry. Nonetheless, there is, as was noted earlier, a considerable green lobby in South Africa, probably with sufficient support (possibly with some backing from the corporate sector), to initiate a scheme now for the financial support of green electricity.

Some ideas are set out below for the phased introduction of such a scheme, starting with the immediate task of putting arrangements in place for supplying WSSD venues with green electricity during the Summit (and beyond if possible).

A draft regulatory and trading framework for a green electricity market in South Africa

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The particular circumstances that need to be taken into account in introducing a green electricity support scheme include the following:

- (i) South Africa has enough surplus conventional generating capacity to take it well into the second half of this decade.
- (ii) Some 10 to 15 million people live without electricity in their homes, and funding of electrification thus remains the highest priority in the electricity sector.
- (iii) The two hundred or so municipal distributors serving the majority of the country's wealthier households (the most likely financial supporters of a green electricity scheme) are soon to be absorbed into some six or seven regional electricity distributors (REDs). The municipal distributors have historically not normally needed to market their services, and some would now be unlikely, especially in view of the impending restructuring, to want to start marketing green power products. The involvement of the distribution sector on a significant scale will therefore need to wait for the establishment of the REDs.

The following is put forward as a possible framework for the phased introduction of financial support for green electricity generation in South Africa.

## **5.1 Phase 1: Arrangements for supplying WSSD venues with green electricity**

A number of eligible generators have been identified, and owners of those venues that have been approached have indicated their willingness to take part in this scheme, despite the premium it will involve.

The most straightforward approach for this purpose (bearing in mind the time constraints) would be for the various generators to issue green certificates (perhaps on a weekly basis) corresponding to their output, and for these to be bought by the venue owners to match their consumption. It would be appropriate for the certificates to be accredited and signed by a representative of the National Electricity Regulator (NER). Auditing is hardly likely to be a requirement, given the nature of the transaction, but it could if necessary be carried out by local agents appointed by the NER. This type of arrangement has a precedent in the schemes in the US whereby end-users can buy green certificates directly from certain generators.

If it could be arranged, an enhancement would be for the respective distributors to be part of the process. They are Eskom's Johannesburg distributor, which for historical reasons serves that part of Johannesburg in which the main conference venue is located, and City Power, which is the Johannesburg municipal distributor. These distributors would then buy the certificates from the generators, and issue 'green invoices' to the conference venues for their consumption. This arrangement could lay the foundation for at least a limited voluntary green power scheme.

A draft regulatory and trading framework for a green electricity market in South Africa

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There is some debate as to whether WSSD venues should pay for their green electricity by way of a premium (of say 30 cents per kWh) over their normal tariff, or by way of a simple 'green tariff' of say 50 cents per kWh. The latter simplified approach would help in creating a clearer public perception of the cost and value of electricity.

## **5.2 Phase 2: An interim voluntary scheme supported by existing utilities**

Despite the uncertainties in the electricity industry regarding its future structure, the momentum and public awareness coming out of the WSSD, as well as the 'greening the Summit' campaign, will provide an excellent springboard for introducing a more general voluntary green power scheme. This would be done in conjunction with both Eskom and willing municipal distributors, with the NER overseeing the scheme.

Financial support can come in a number of ways: through a premium on the existing tariff, through a green consumption-based tariff, or through a flat monthly contribution. It is likely that the available green generation will be taken up quite quickly. Funds collected over and above that could go towards new green generation capacity. (Seeboard's Green Fund Trust provides a model for this.)

## **5.3 Phase 3: Establishment and participation of the REDs**

The setting up of regional distributors in perhaps two years' time offers a good opportunity for the direct support of green electricity to be made available to all electricity customers, albeit still on a voluntary basis. REDs should therefore be required to offer a portfolio of green products, enabling customers to support the programme to whatever extent they can afford.

This would also seem to be an appropriate time to aim for a more formal generation accreditation process and the setting up of a formal register of green certificates, a task that the NER would seem best suited to take on. As was mentioned above, various commentators have noted that public confidence in the integrity of such schemes is crucial to their success, particularly where public trust of commercial practices might not always be high.

It is envisaged that there could be perhaps five or ten years' experience with this type of system before moving to the next phase. Electrification should by that time be virtually complete, and for the reasons touched on in the Introduction to this document, the cost gap in South Africa between conventional and green electricity will have narrowed.

## **5.4 Phase 4: A mandatory scheme perhaps by 2010**

The timing, extent and form of this development would depend, for example, on what level of international agreement has been reached on limitations on carbon dioxide emissions, on the level of public and governmental backing for green power schemes, and on cost trends in green electricity generation.

A draft regulatory and trading framework for a green electricity market in South Africa

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As was mentioned earlier, the European Commission will report only in 2005 on the respective merits of the various mechanisms available for stimulating green electricity generation (based on the experience of its member countries). It would thus be inappropriate here to discuss whether, for example, a certificate system or fixed prices would ultimately be the best mechanism for South Africa.

But the brief scan of international mandatory programmes presented in this document does at least indicate the feasibility of putting such a scheme into place with relatively little administrative overhead.

## 6. Conclusions

For the reasons outlined earlier, South Africa is not in as good a position as many other countries to support green electricity generation. Yet there is significant support for greater expenditure in this direction, in both the private and the corporate sector. The WSSD presents an outstanding opportunity to start putting in place a formal system whereby this support can express itself in a more tangible, albeit voluntary, way.

Green electricity is indeed expensive compared to conventional power generation. But given South Africa's position as one of the world's major users of fossil fuels, we do have a responsibility to contribute what we can to a reduction in greenhouse gas emissions. As one of the major countries in Africa, the example South Africa provides is important, possibly even beyond our continent.

Indications are that carbon and green electricity quotas may soon be met through international trading of certificates. (This is already a clear direction in Europe.) Given South Africa's wind generation potential along the sparsely populated western Cape coast, and the enormous scope for solar generation, the country could benefit substantially from playing an active role within the international green energy community. This would also stimulate the development of a local green electricity generation industry (probably in conjunction with an international partner) that would offer good export opportunities.

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# CRITERIA FOR CERTIFICATION OF ELECTRICITY GENERATION PLANT FOR PARTICIPATION IN A GREEN ELECTRICITY MARKET IN SOUTH AFRICA

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## 1. Background

Electricity is an attractive form of energy – convenient, versatile and clean (at the point of use). However, no form of electric power generation is completely benign and furthermore, some generation systems are less environmentally and socially damaging than others. For example, generation systems which utilize renewable energy – such as wind, solar and biomass – are judged to be less problematic than non-renewable generation systems such as coal, nuclear or natural gas-powered systems.

Green electricity – electricity which is generated in a sustainable manner from renewable resources – is becoming more widely available in international markets as a differentiated service offering<sup>1</sup>. This market phenomenon is driven by the growing awareness of the need for alternatives to fossil- and nuclear-based electricity generation and the environmental concerns regarding the contribution of these technologies to global climate change.

This document sets out criteria for identification and certification of green electricity generation capacity. The document is intended to provide a basis for discussion and preliminary use in the implementation of the Green Power for WSSD Project.<sup>2</sup>

## 2. Purpose of certification of green electricity

It is critical that green electricity be regulated to:

- ensure consumer confidence
- support the use of renewable energy,
- track the source/s of green electricity,
- monitor the supply and the demand for green electricity,
- disclosure of green electricity producers; suppliers of green electricity, e.g. reporting mechanisms,
- provide macro-economic indicators
- flexibility of those demanding energy in sourcing energy from different renewable energy sources

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<sup>1</sup> Final Report of the G8 Renewable Energy Task Force, <http://www.renewabletaskforce.org/>.

<sup>2</sup> The Green Power for WSSD Project is a DEAT initiative which is funded by USAID. The primary goal of the project is to facilitate the supply of green electricity into the four main venues of the WSSD for the duration of the WSSD process.

Criteria for certification of electricity generators in South Africa

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- contribution towards national and international environmental and energy goals and objectives and,
- also for parity and congruence with international climate change conventions and trading regimes

Until recently, individual countries and selected federal states in the USA have established local standards and certification frameworks for green electricity. The lack of consistency and parity between different regulatory authorities has been a constraint to the development of the green electricity market and undermined consumer confidence.

The increasing interest in green electricity and the potential for international trade has stimulated some initiatives to establish internationally accepted standards and certification processes<sup>3</sup>.

South Africa does not yet have any green electricity certification framework. It is strategically important for SA to develop a framework to open up the potential for domestic, regional and international trade in green electricity.

Initially, green electricity certification in SA is intended to provide a basis for identifying and certifying electricity producers which would be eligible to acquire tradeable green electricity certificates as envisaged in the associated discussion document on a green electricity certificate system for SA (Dingley, 2002)<sup>4</sup>.

### **3. Certification authority**

The National Electricity Regulator (NER) is the appropriate authority for certification and ongoing monitoring of green generation capacity and green electricity production.

### **4. Process**

The certification process will include the following basic steps:

- Application to NER for certification by a power producer
- Assessment of resource utilization (resource disclosure)
- Assessment of sustainability criteria (EIA, social and financial assessments)
- Quantification of the power and production capacity

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<sup>3</sup> [www.greenelectricitynetwork.org](http://www.greenelectricitynetwork.org)

<sup>4</sup> Dingley C (2002), Green electricity certificate system, Discussion document, AGAMA Energy (Pty) Ltd.

- Issue of certificate
- Monitoring

## **5. Criteria**

### **5.1 Resource disclosure**

Power producers wishing to obtain certification as a green power producer will need to provide a resource disclosure as the basic starting point for assessment prior to certification.

The basic qualifying resources include renewable energy resources such as solar, wind, geothermal and wave energy.

Non-renewable fuels such as coal, oil, nuclear and gas – the so-called conventional or traditional fuels – are excluded.

Furthermore, certain renewable resources, such as biomass and hydropower, are qualified on the basis of considerations such as scale, emissions and other impacts.

### **5.2 Comments on each resource**

#### **5.2.1 Solar**

All solar projects are considered to be acceptable (subject to the normal environmental, social and financial project development processes).

#### **5.2.2 Wind**

All wind projects are considered to be acceptable (subject to the normal environmental, social and financial project development processes).

#### **5.2.3 Wave**

All wave projects are considered to be acceptable (subject to the normal environmental, social and financial project development processes).

#### **5.2.4 Geothermal**

All geothermal projects are considered to be acceptable (subject to the normal environmental, social and financial project development processes).

These are not likely candidates in South Africa in the near future although there is some capacity in Tanzania.

### 5.2.5 Hydro

Hydropower is considered renewable and sustainable if the plant meets basic ecological and social criteria at a local and global scale.

A broad primary categorization of hydropower has been into small or large hydro based on the generation capacity. New, and existing, small hydro is generally accepted as green whereas large hydro is generally excluded on the grounds of the negative impacts of large dams ([www.dams.org](http://www.dams.org)). In some countries, new large hydro is considered green if it meets the environmental, social and economic oversight requirements of new development projects.

A secondary categorization has been to exclude plant which is not run-of-river.

#### USA

In the USA, qualifying hydropower plant includes facilities whose output is equal to or less than 30 megawatts (reference ?). In New England, hydro facilities relicensed by FERC after 1986 also qualify. Hydropower facilities certified by the Low Impact HydroPower Institute will qualify for Green-e beginning January 1, 2001 in California and January 1, 2002 in all other regions ([www.lowimpacthydro.org](http://www.lowimpacthydro.org)).

#### Europe

In Europe, the EUGENE standard for green electricity labelling<sup>5</sup> existing hydropower plants may be eligible 'if they operate in such a way as to protect the environment'<sup>6</sup>. The power producer may be 'required to invest a fixed payment per kWh sold for restoring, protecting or upgrading the environment in the catchment and riparian area in question'.

Furthermore, new<sup>7</sup> (or expanded) hydropower plant qualifies if the facility 'leads to a substantial improvement of the local and regional ecological quality (in excess of legal requirement)'.

The draft Directive on Renewable Sources of the European Commission uses an installed capacity of 10 MW as upper limit cut-off for sustainable hydro<sup>8</sup>.

### 5.2.6 Organic fuels (Biomass)

Biomass-based electricity generation plant may be eligible for certification if the fuel is sourced from sustainable sources and, in addition, the fuel is converted into electricity in an environmentally acceptable manner.

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<sup>5</sup> [www.greenelectricitynetwork.org](http://www.greenelectricitynetwork.org)

<sup>6</sup> refer to criteria and methodology in Swiss green hydro standard developed by EAWAG.

<sup>7</sup> the base date adopted in the EUGENE standard for defining 'new' facilities is 1<sup>st</sup> January 2001.

<sup>8</sup> Hydropower in green pricing schemes, [www.greenprices.com](http://www.greenprices.com)

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## USA

In California<sup>9</sup>, qualifying sources of biomass include all wood based biomass, agricultural crops or wastes, animal and other organic wastes, landfill gas and municipal solid waste.

In the Mid Atlantic, approved biomass sources include: landfill gas, digester gas, clean urban waste wood (no painted, treated, or pressurized wood or wood contaminated with plastics or metals) animal and other organic waste, non-herbaceous agricultural waste, mill residues, bioenergy crops.

In New England, Ohio, and Texas, qualifying sources of biomass include: waste wood (including construction debris that does not contain any painted, treated, or pressurized wood), agricultural crops or waste, animal and other organic waste, digester gas, and landfill gas. In Ohio, the use of whole trees, tops, and logging slash as a biomass resource will be revisited in two years, or 7/01/03.

Biomass emissions are a further consideration in both New England and the Mid Atlantic, where the average weighted NOx emissions from all biomass sources, except landfill gas or digester gas, that contribute to a specific Green-e product sold in New England or the Mid Atlantic shall not exceed:

- 2.9 lbs./MWh in 2000, 2001, 2002;
- 2.63 lbs./MWh in 2003, 2004, 2005; and
- 2.25 lbs./MWh in 2006, 2007, 2008.

In New England only, the NOx emissions from landfill gas facilities shall not exceed 3.5 lbs./MWh based on a weighted average of the landfill gas mix contributing to a specific Green-e certified product.

## Europe

In Europe, biomass sources may include: dedicated energy crops, crop and forestry residues, residues from landscape and park management, 'clean' wood waste products from manufacture and building, vegetable processing residues and sewage gas.

Electricity generated from all forms of thermochemical processing of unseparated solid wastes and sewage sludge is excluded.

New (post January 1<sup>st</sup>, 2001) biomass generation plant utilizing dedicated energy crops shall come from Forest Stewardship Council (FSC) certified sources. Existing plant have a four year window period for sourcing fuel material from FSC certified sources.

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<sup>9</sup> <http://www.green-e.org/>

Criteria for certification of electricity generators in South Africa

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Co-firing biomass with coal is permitted if the respective energy inputs are separately accounted for. Only the energy derived from the biomass energy input is eligible as green electricity.

#### **5.2.7 Landfill gas (methane)**

Landfill gas generation plant should qualify if the emissions of the plant comply with emission limits which still need to be determined for SA.

#### **5.2.8 Negawatts**

The concept of 'negawatts' is important and negawatts should be considered in future. Problems with the certification of negawatts include the issues of baselines and verification of savings.

#### **USA**

In Pennsylvania only<sup>10</sup>, "negawatts" which meet the guidelines of the Negawatts Program as developed by CRS and the Pennsylvania Advisory Committee may be counted toward the renewable portion of a Green-e product.

#### **5.2.9 Off-grid PV / wind**

There are no known precedents for green electricity certification of off-grid generation capacity. In South Africa, the off-grid concessions are a unique case which deserves consideration.

Off-grid solar and wind systems should qualify for eligibility to acquire green power certificates. In cases where the assets are owned by individual households, the administrative complexity of certification of many thousands of small off-grid producers may prove impractical.

In cases where a utility owns the assets, the administrative issues are not prohibitive and the off-grid utility should qualify for green certificates.

#### **5.2.10 Items for consideration in the future**

#### **USA**

The Green Power Board<sup>11</sup> supports the development of a standard for sustainable biomass fuel supply and emissions and a standard for low impact wind. Green-e will consider for adoption such standards as they are developed on a national, regional or state basis.

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<sup>10</sup> [www.green-e.org](http://www.green-e.org)

<sup>11</sup> <http://www.green-e.org>

Criteria for certification of electricity generators in South Africa

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Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.

### **5.3 Sustainability criteria**

Sustainability criteria (social, environmental and economic) are to be provided through the due legislative and procedural requirements for project development.

### **5.4 Verification**

Periodic and regular verification is required, especially for biomass plant, to confirm compliance with the certification for each plant. Planned visits should be scheduled for 6 month intervals and un-announced visits may be undertaken at any time.

Criteria for certification of electricity generators in South Africa

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## 6. Recommendations

Recommendations for South Africa, and specifically for the Green Power for WSSD Project are:

### 6.1 Energy source

Eligible energy sources	Comments
Solar	Grid-connected and utility off-grid
Wind	Grid-connected and utility off-grid
Biomass	Wood, crop residues, clean wood waste, clean food processing waste, biodiesel, clean landfill gas Biomass component of co-fired plant
Hydro	Existing hydro – run-of-river plant with an installed capacity of less than 30 MW  New hydro – any scale as long as the project complies with environmental, social and economic legislation and oversight procedures (such as EIA's)

Ineligible energy sources	
Coal	Non-renewable
Nuclear	Non-renewable
Natural gas	Non-renewable
Diesel / Heavy fuel oil	Non-renewable
Paraffin	Non-renewable
Unsorted solid waste	Environmentally problematic
Sewage sludge	Environmentally problematic

Potential sources ( to be developed )	
Negawatts	Baselines and verification issues need to be clarified
Landfill gas (methane)	Environmental criteria, such as emissions, need to be established and regulatory mechanisms set in place

## 6.2 Environmental and social sustainability

Compliance with all government renewable energy legislation, electricity legislation, social/development/upliftment legislation, environmental legislation and licensing requirements.

## 6.3 Base date for 'new' plant

1<sup>st</sup> January 2002 may be an appropriate base date for new plant in SA.

## 6.4 Imports

All hydro and biomass imports should comply with an SA equivalent certification framework in the country of origin. Solar, wind, geothermal and wave derived green power only requires verified metering and accounting.

## 7. References

1. Dingley C (2002), Green electricity certificate system, Discussion document, AGAMA Energy (Pty) Ltd
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3. EUGENE (2002), Standard for green electricity labeling, European Green Electricity Network, [www.greenelectricitynetwork.org](http://www.greenelectricitynetwork.org).
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5. Greenprices (2001), Hydropower in green pricing schemes: a sustainable source of power?, [www.greenprices.com](http://www.greenprices.com).
6. <http://www.epa.gov/globalwarming/actions/cleanenergy/greenpower/index.html>
7. <http://www.greenelectricitynetwork.org/>
8. <http://www.rapmaine.org/gpnews8.htm>
9. <http://www.dams.org>

**Annexure K. - One World Sustainable Investments –  
Sourcing Green Electricity, Engaging with the CDM and  
Sourcing Financing for Tariff Differentials**



**OneWorld**  
Sustainable Investments

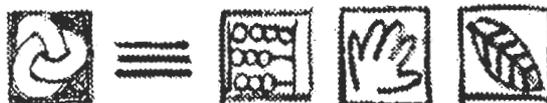
**GREEN POWER FOR THE WORLD SUMMIT FOR  
SUSTAINABLE DEVELOPMENT**

**FINAL PROJECT DELIVERABLES**

Demonstration Project for the Promotion of Sustainable  
Development and Climate Change Mitigation

*TASKS 3,7 – Sourcing Green Electricity, Engaging with CDM, and  
Sourcing Financing for Tariff Differentials*

Appreciating your natural, social and financial assets



## **TASK OBJECTIVES**

### Overview

The overall objective of the OSI participation is to ensure success of the project by supporting the achievement of the key task objectives listed below.

Additional inputs were also required by nature of the networking completed, investment facilitation that took place, fundraising or grant matching that was undertaken, sourcing of green energy producers that was initiated, as well as media and/or additional publicity provided to the project.

The core task objectives included the following:

1. Engage with the CDM;
2. Sourcing green electricity (support);
3. Funding for green electricity premium;

A key objective of the OneWorld Sustainable Investments was to facilitate investment into the renewable energy sector both prior to -, during-, and post the WSSD. Whilst the task were focused on the immediate project deliverables, longer term investment facilitation objectives as well as project identification objectives were also targeted and achieved.

## **LIMITATIONS**

A number of limitations emerged during the set-up and roll-out of the project:

1. Accessibility to clean sources of electricity generation through reliable sources;
2. Complexity of relationship with key stakeholders who have their own set of interests in providing green electricity into the grid;
3. Complexity of engagement process with national generator;
4. Reluctance of key potential participants, funders and project supporters to engage in what was seen to be a complex project without a supporting regulatory and legal framework, and where the returns were seen to be hard to quantify and in some cases, justify ;
5. Lack of understanding on the part of funders as to the benefits of a project within the constraints of the current regulatory framework.

Despite the initial perceived limitations, the team undertook to complete the deliverables as indicated in the following sections.

## SUMMARY OF KEY OBJECTIVES AND DELIVERABLES

### Task 7: Engage with CDM

The objective was to establish contact with key agencies and institutions linked to the CDM process in order to ensure the project is recognised as either a current or future potential CDM opportunity.

The complexities of the CDM negotiations and frameworks relevant to South Africa were also focused on with a view to determining the impact of the various processes on future potential project identification and implementation.

Additionally, the focus was to ensure that we are able to attract sufficient pre- and post-WSSD investment in order to secure substantive growth and realisation of the opportunities identified during this project.

Sub - task	Actions	Outputs	Delivered Outputs
7.1 Identify CDM Liaison points	<ol style="list-style-type: none"> <li>1. Identify local SA contact points and meet with key people</li> <li>2. Establish criteria for registration of CDM projects</li> <li>3. Assess impact of CDM and Sustainable Development criteria on potential projects</li> </ol>	<ol style="list-style-type: none"> <li>1. List contact points</li> <li>2. Attend workshops and individual briefings</li> <li>3. Identify sources for project development and support for CDM projects</li> <li>4. Register WSSD project with Johannesburg Climate Legacy project</li> </ol>	<ol style="list-style-type: none"> <li>1. Listed contacts</li> <li>2. Workshop summary and contact established</li> <li>3. Register project on JCL through SSN – conduct discussion with Steve Thorne</li> </ol>
7.2 Develop CDM opportunities	<ol style="list-style-type: none"> <li>1. Identify 5 major projects</li> <li>2. Develop investment opportunity profiles</li> <li>3. Secure agreement from potential CDM partners for participation in projects</li> </ol>	<ol style="list-style-type: none"> <li>1. List projects with descriptions</li> <li>2. Conduct discussions with CDM liaison points</li> <li>3. Secure commitment to projects</li> </ol>	<ol style="list-style-type: none"> <li>1. Listed project descriptions</li> <li>2. Summary of key discussion resolutions</li> <li>3. Project commitments listed</li> </ol>
7.3 Optimal generation mix	<ol style="list-style-type: none"> <li>1. Identify production sources</li> <li>2. Develop mix profile</li> </ol>	<ol style="list-style-type: none"> <li>1. Initiate discussions with generator (preferably large scale independent generator) Mix profile : White paper Contribution</li> </ol>	<ol style="list-style-type: none"> <li>1. Initial inputs to project team in support of tariff development</li> </ol>

7.4 Project pipelines for new investment	<ol style="list-style-type: none"> <li>1. Identify 3 core projects</li> <li>2. Develop investment profiles</li> <li>3. Develop investor profiles</li> <li>4. Secure investor interest and participation and/or commitment to financing</li> <li>5. Secure Letters of Intent to develop future projects</li> </ol>	<ol style="list-style-type: none"> <li>1. List projects with descriptions</li> <li>2. Investor profiles List investor discussions and initiate discussions</li> <li>3. 3 Letters of Intent from anchor investors and project developers</li> </ol>	<ol style="list-style-type: none"> <li>1. Project listings</li> <li>2. Investor profiles</li> <li>3. Letters of Intent</li> </ol>
7.5 Green Power investment conference	<ol style="list-style-type: none"> <li>1. Refine conference framework concept for approval</li> <li>2. Secure venue – meet with venue owners</li> <li>3. Develop budget and funding proposal</li> <li>4. Profile conference participants</li> </ol>	<ol style="list-style-type: none"> <li>1. Develop conference Framework</li> <li>2. Draft budget &amp; costings to support plan development</li> <li>3. Participant profiles and criteria to support plan development</li> <li>4. Initiate discussions with key anchor participants</li> </ol>	<ol style="list-style-type: none"> <li>1. High level conference brief and plan</li> <li>2. List potential conference anchor sponsors (included in the conference plan attached)</li> </ol>

### Task 3: Sourcing Green Electricity

The objective was to assist in sourcing or identifying additional generation capability within the country in support of Agama and Charles Dingley. This coincides with sourcing investment opportunities with various players.

Sub - task	Actions	Outputs	Delivered Outputs
3.1 Identify available green generation capacity in SA (support)	<ol style="list-style-type: none"> <li>1. Identify 5 potential producers of electricity</li> <li>2. Initiate discussions for sourcing with practitioners</li> <li>3. Confirm potential sources through NER</li> </ol>	<ol style="list-style-type: none"> <li>1. List of sources</li> <li>2. Confirmed discussions with key individuals</li> <li>3. Commitment from NER for registration of new sources of electricity</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact with key supplier initiated and handed over for further development to project lead</li> </ol>

## Auxiliary Task: Funding for Green Premium

The objective of this task was to secure funding for the differential between the conventional tariff and the cost of the green electricity supply. A number of potential sponsors were approached with a view to funding the tariff differential. The approach was supported by the opportunity for the various potential sponsors to become involved in the investment conference that was to be hosted at a future date, and which would build on the success of the WSSD project.

Sub - task	Actions	Outputs	Delivered Outputs
A.1 Develop value proposition for potential funders	<ol style="list-style-type: none"> <li>1. Agree initial proposition with project team</li> <li>2. Develop proposal to present to key players</li> <li>3. Research key issues related to market value for potential funders</li> </ol>	<ol style="list-style-type: none"> <li>1. Defined value proposition</li> <li>2. PowerPoint format proposal</li> </ol>	<ol style="list-style-type: none"> <li>1. Value proposition for funding</li> <li>2. Proposal to funders</li> </ol>
A.2 Identify potential funders by industry and interest area	<ol style="list-style-type: none"> <li>1. List key target funders &amp; establish contact with link people</li> <li>2. Secure presentation opportunities</li> <li>3. Conduct presentations</li> <li>4. Follow-up and continued liaison</li> <li>5. Establish board level interaction with key investment and funding partners in private sector</li> </ol>	<ol style="list-style-type: none"> <li>1. List of key private sector and public sector funders.</li> </ol>	<ol style="list-style-type: none"> <li>1. List of key private sector and public sector funders</li> </ol>

## KEY DELIVERABLES

### Task 7: ENGAGE WITH CDM

#### 7.1 Identify CDM Liaison points

##### 1. Contact Points

The team met with various key players involved in the development of the Clean Development Mechanism. The objective was to establish progress in the development and implementation of the CDM with a view to obtaining clarity of the criteria for project registration and funding support. Meetings were held with the following key people:

1. **Steve Thorne: Director, South South North Project ([www.southsouthnorth.org](http://www.southsouthnorth.org))**

Criteria for the ensuring the compliance of projects with the CDM were discussed. Key challenges for projects to be registered include the clear establishment of carbon emissions reductions opportunities. Methodologies for the calculation of carbon baselines were discussed. It is evident that from the pilot projects conducted under the auspices of the SSN project, a strong focus is on energy efficiency and small scale off-grid generation. No significant projects exist for large scale bulk renewable energy generation.

The Sustainability Criteria for projects have been established in draft format and are accessible on the Johannesburg Climate Legacy website. These criteria, whilst still in draft format and needing adoption by parties broader than the JCL parties, provide sufficient guidelines for what may be used to assess projects by either the DBSA, the PCF as well as the government as part of the commitment to implementing the CDM guidelines. There is no clear indication as to the timeframes for implementation of the criteria and whether these will be adopted across the board in terms of project development.

2. **Rob Short, Development Bank of Southern Africa**

The DBSA is keen to support the development of new generating capability but would most likely enter specific projects based on the initial viability assessments conducted. DBSA to play a leading role in the development and implementation of the PCF, and would assist the Department of Environmental Affairs and Tourism, as well as the Ministry of Trade and Industry to speed up the signing of the host country agreements.

3. **Mike Marler, Development Bank of Southern Africa**

The infrastructure development division of the DBSA is keen to support the development or large scale new generation capability. Constraints exist in terms of the banks policy on long-term commitment to projects that may need additional security. The Bank committed to providing funding for initial feasibility studies on specific projects with a view to longer term investments.

4. **Mr Bob Chronowski, World Bank Prototype Carbon Fund**

The PCF has committed itself to support commercially driven energy generation projects. In particular the commitment was given to involvement in the Kouga Energy initiative in the Eastern Cape which is being driven by Dr Andries van der Linde and Genesis Eco-Energy, which is a subsidiary of Sudor Eco-Ventures.

5. **Mr Berend du Pon, Head: Corporate Finance - Rabo Bank International**

During the visit and presentation to Rabo Bank International in the Netherlands, the bank committed itself to participating in new generation projects in Southern Africa on behalf on its client base in Europe.

Rabo Bank has an interest in buying up carbon credits and engaging in initial project finance in order to establish projects that will support its objectives of sourcing carbon credits for its clients. Rabo indicated that it would potentially participate in renewable energy funding structures other than those directly related to carbon credit financing.

## **2. Briefings Attended on CDM**

Various members of the team attended individual briefings and conducted research into ongoing CDM developments. Past and ongoing activities include:

- Attendance of Private Sector workshop held by the **Energy Research Institute at UCT**: "Clean Development Mechanism (CDM) Capacity-building Amongst the Private Sector in Southern Africa (CAPSSA)";
- **Briefing by Mr Steve Thorne** on project development criteria and the development of baselines for emissions reduction calculations: the meeting focused on the methodologies for calculating emissions reductions of projects in order to develop accurate project feasibility studies and investment plans. The WSSD project brief was also developed and submitted to the Soutsouthnorth team for registration as a CDM project and to be included in the Johannesburg Climate Legacy Project.
- **Briefing by E3 International ([www.ethree.com.au](http://www.ethree.com.au))** on support for potential project development and transactions with Australian companies for the purposes of trading in emissions reduction certificates; Australian utilities were approached via E3 International with a view to assessing the feasibility of purchasing credits from South Africa in the event of cross-border transaction and trading mechanisms being established. Australian utilities were interested in purchasing credits through emissions trading regimes and indicated a willingness to develop "token transactions" in order to secure their participation in the project. However, these utilities were unclear as to their involvement or investment in future technology development programmes that might be developed under the auspices of the CDM. These utilities indicated that in terms of investment in any form, or support for CDM based projects, investment criteria and hurdle rates would need to suit their profiles and financial parameters.
- **Discussions with Energy for Sustainable Development ([www.esd.co.uk](http://www.esd.co.uk))** to discuss the development of project support capability for project development in South and Southern Africa.

ESD indicated a willingness to expand their working relationship with OSI and Agama based on work in progress.

## **3. CDM Project Development Sources and Partners**

This deliverable dovetails with point 2. above. However, in this work task, a number of organisations who are skilled and experienced in the area of project development within the CDM frameworks

were contacted with a view to establishing potential partnerships.

▣ **Energy for Sustainable Development**

Discussions with Energy for Sustainable Development ([www.esd.co.uk](http://www.esd.co.uk)) to discuss the development of project support capability for project development in South and Southern Africa. ESD are co-operating on further project development with Agama and expressed their intention to front a number of projects within the Africa sub-continent related to CDM. Active canvassing for projects is being conducted by ESD with a view to further local partnerships in South Africa.

▣ **Enviros**

Contact was established, and briefing discussions held, with UK based consultancy, Enviro ([www.enviros.com](http://www.enviros.com)), who are working on the landfill methane harvesting project with the Durban (Ethekweni) Metropolitan Council. These discussions centred around the establishment of projects within South and Southern Africa and potential collaboration during the set-up phases of projects. Enviro would act as project consultants whose major objective would be to develop and prepare projects for registration within the CDM frameworks.

▣ **Energy for Development Research Centre**

Discussions were held with EDRC as part of the process of developing the CDM Guidebook for project developers. EDRC expressed interest in working with potential project aimed at registration through the CDM process.

▣ **South African Government: Department of Environmental Affairs and Tourism and Department of Trade and Industry.**

Contact was made with both of these departments who are key to developing the criteria for sustainable development linked to the CDM process. It was apparent from these discussions that the Development Bank of Southern Africa is playing a key role in the structuring of the relationship between the South African government and development partners, and overseas agencies, working with the development of the CDM process in South Africa. Members of the project team interacted with the South African government both locally and during participation at international conferences in Germany and the United Kingdom.

#### **4. Register WSSD project with Johannesburg Climate Legacy project (JCL)**

The WSSD project was discussed with Mr Steve Thorne and an undertaking given to register the project with the JCL. The JCL however, has seen the WSSD project as a competing initiative in the initial phases of discussion. The registration of the WSSD project was initially slowed down until clarity could be gained as to the potential amount of funding that may be secured from the funds procured by the JCL, as well as the overall contribution of the WSSD project to the objectives of the JCL.

However, the JCL was not clear on funding mechanisms and criteria for projects, and there was doubt raised by the JCL committee as to whether the WSSD Project would meet the typical development guidelines established by the overview committee. It was decided not to pursue the further registration of the project with the JCL as the decision-making process within the JCL had not been finalised with regard to the WSSD project.

## 7.2 Develop CDM opportunities

The objective has been to develop a number of key opportunities that can be developed for submission to either the CDM or PCF for potential funding. These projects were identified based on work with a number of organisations who are already engaged in the development of small and medium scale projects in South Africa, as well as projects that are in conception phase.

### 1. List 5 projects with descriptions

A number of new projects were identified through ongoing liaison with internal and external project partners. Principal constraints in this area included the reluctance of certain major players to agree to submit their projects for registration and discussion based on the confidentiality of the projects and cited "competitive advantage" constraints.

Despite these perceived constraints a number of projects were identified with a view to the facilitation of further discussions and Project Definition Workshops (PDW).

Project Initiator	Nature of Project
La Motte Empowerment Trust	5MW Biogas plant linked to community forestry
The Kouga Energy Company	5MW wind & 7,5MW small scale hydro (to be scaled to 20MW)
Millenium Biofuels	10 MW plant linked to biofuel processing (biodiesel)
Namibian Electricity Authority	20MW Wind Park
Energy Newco (name withheld for confidentiality)	300MW Wave Power Project

### 2. Conduct discussions with CDM liaison points

Discussions relating to the development of the projects identified were presented to various of the potential CDM liaison points and project developers. In particular, the Kouga Project based in the Eastern Cape Province was discussed with the World Bank Proto-type Carbon Fund as well as CDM development partners such as ESD and E3 international.

Both the local development partners, The Development Bank of Southern Africa, as well as the Proto-type Carbon Fund have expressed interest in becoming involved in the projects. The PCF liaison person, Mr Bob Chronowski visited the project site in Kouga.

### 3. Secure commitment to projects

Commitments to involvement in the projects identified were obtained from various of the project partners involved. These are listed below, along with the envisaged roles and responsibilities or interests that the various parties have forwarded to the project team.

Project	Investment Partner	Role/Interest
Kouga Wind Farm	Genesis Eco-Energy	Project Initiator
	OneWorld Sustainable Investments (OSI)	Project development and financial transaction management
La Motte	La Motte Empowerment Trust	Project Initiator
	OSI/Genesis	Project Developers

	Undisclosed Foreign	Provision of biogas technology
10 MW Biofuel plant	Technology partner Millennium Biofuels	Project Initiator
	OSI	Project Finance & transaction management
20 MW Wind Park	Namibian Electricity Authority	Project Initiator
	Mcom/Agama Energy	Project Developers
	OSI/ ABB	Project development and finance structuring
300 MW Wave Power facility	Newco	Project R&D and development
	OSI / ABB	Project review & viability assessment

### 7.3 Optimal generation mix

#### 1. Initiate discussions with generator (preferably large scale)

The focus of this element was two-fold:

- ▣ to develop a position with regard to the desired optimal generation mix based on future projections for the South African renewable energy sector, and to submit these to government as part of the legislative review process;
- ▣ to develop a mix of sources for the generation of electricity for the WSSD venues, with a view to mirroring the desired future mix in the national generation pool.

The optimal generation mix, based on current estimated source availability as per studies from the World Bank, various international consulting groups, Eskom, The Council for Scientific and Industrial Research and the Department of Minerals and Energy, was formalised for input into the position paper to government as well as to the project component dealing with tariffs.

The overall study encountered a number of constraints most notably the unwillingness of key sources of data to provide this information to the project team. However, visits to key sites, including the interaction with the Klipheuwel Windfarm development team and the renewable energy task team and the CSIR provided a certain level of data. This data has been questioned in terms of its reliability and a new study has been commissioned by government to accurately assess potential for a number of renewable energy sources.

Assessments of potential vis-à-vis the optimal generation mix are still under way given the complexity of interaction between parties (and the resultant lack of access to clear and reliable data) and the available data has been incorporated into the tariff study.

#### 2. Energy White Paper contribution

The WSSD project team developed a position paper to the national Department of Mineral and Energy Affairs as part of the ongoing legislative review and development process in order to stimulate the development of a renewable energy industry, as well as commitment by government for national renewable energy targets in South Africa.

The submission is attached as Appendix 2.

### 7.4 Project pipelines for new investment

The objective of the section dovetailed with the previous section which aimed to initiate discussions with a number of parties with a view to securing commitments to future projects.

A number of projects were discussed with potential project initiators but a limited number of confirmed commitments were received from, or made by, potential project developers. In terms of the overall project deliverables, the key achievements based on the overall time spent in negotiations with various project proponents is highlighted below.

1. List projects with descriptions

Project Initiator	Nature of Project
La Motte Empowerment Trust	5MW Biogas plant linked to community forestry
The Kouga Energy Company	5MW wind & 7,5MW small scale hydro (to be scaled to 20MW)
Millenium Biofuels	10 MW plant linked to biofuel processing (biodiesel)
Nampower	20MW Wind Park
Energy Newco (name withheld for confidentiality)	300MW Wave Power Project
International Mining Company	15 MW Recovery and generation of energy through excess waste from mill operations (biomass)
Sawmilling Company (Western Cape)	5 MW energy recovery through milling operations

2. Investor profiles

Profiles of the investor organisations are highlighted in section 1 and repeated here. A number of the future investors have made clear commitments as was indicated through the signing of MOU's with South African development partners, in particular OneWorld and Genesis Eco-Energy.

Funding Source	Nature of organisation	Proposal response
WipCapital	Investment banking and financial services	WipCapital indicated their interest in investing in future projects. A key interest remains the partnering with other institutions in developing a renewable energy fund.
Old Mutual Asset Management	Investment Banking and Asset Management	Through the various infrastructure funds that the bank manages, OMAM indicated they would be interested in working toward the establishment of a renewable energy fund, and thereby investing in new generation projects.
Rabo Bank International	Investment and Retail Banking	Has committed itself to partnering with OSI in the development of a renewable energy fund, and through this

		vehicle investing in new generation projects in South Africa.
Investec Asset Managers	Investment Banking	Proposals to establish a renewable energy fund are in their infancy. A business plan for such a venture is under development. OSI/ AGAMA will assist with the development of this plan.
Rand Merchant Bank	Investment Banking	Interested in new investment opportunities given the advisory work they do for their clients in the field of energy services.
Large International Energy technology Company	Technology development and turnkey energy project development services.	In process of signing an MOU with OneWorld for the provision of turnkey project development services to SA partners.

### 3. 3 Letters of Intent from anchor investors and project developers

Letters of intent regarding the development of projects were sought from the top three project initiators. On closure of the project the following progress had been made given the complexity of the investment decisions being made by the Boards of the respective companies:

- ▣ Signing of MOU between OSI/AGAMA and international project developer in final stages. Signing completed by mid-December 2002;
- ▣ Power Purchase Agreements and a Letter of Intent between The Kouga Energy Company and Eskom are in final phases of signing based on mandates from the Eskom Board;
- ▣ The third Letter of Intent, between The La Motte Empowerment Trust and the Italian project partners is under negotiation and pending a visit to South Africa by the project developers and technology partners.

### 7.5 Green Power investment conference

The objective of this section of the project was to develop a framework for an investment conference to be held in South Africa with the express purpose of stimulating both national and international investment into renewable energy projects.

#### 1. Develop conference Framework

A conference framework was developed (see Appendix 1) within the guidelines discussed by the team. The conference aims to have a strong investment theme to it with the key objective being to focus government as well as private sector investors on the need for a sound framework that will facilitate investment into the development of the renewable energy sector.

#### 2. Draft budget & costings to support plan development

Estimations were completed for this aspect of the plan. A figure of R 26 000.00 has been set aside to provide for the set-up and planning of the conference, whilst the second phase, actual mobilisation and implementation, has been costed at R 60 000.00. The overall running cost of the conference has been included in the total budget which is R 345 000.00. It is envisaged that a major portion of the conference costs will be covered by key sponsors and that a small portion will be recovered from conference delegates (35-40%). This has been done in order to secure the participation of key delegates and to ensure that such a conference is affordable.

A detailed conference plan as well as budget will be drawn up by the project team that are secure to run the overall development of the project.

### 3. Participant profiles and criteria to support plan development

These are included in the overall conference plan which is attached.

### 4. Initiate discussions with key anchor participants

Initiation of discussions with various conference organisers as well as potential participants has been initiated during the process of canvassing for funding. A number of anchor sponsors within the private sector in South Africa have been identified and included in the overall conference master plan.

Two additional sub-objectives were achieved:

- Secure interest from international conference organisers:  
In addition to local partners, international conference facilitators and development organisations such as IQPC and Marcus Evans International have expressed interest in the project.
- The World Wind Energy Conference has been awarded to South Africa as the next host country. The organisers of the conference, the South African Wind Energy Association, have approached the WSSD Project team with a view to joint hosting of the conference in order to run the two conferences back-to-back, given the opportunity for investment facilitation into South Africa.

## Task 3: SOURCING GREEN ELECTRICITY

### 3.1 Identify available green generation capacity in SA (support)

#### 1. List of sources

Contact was initiated with the Tongaat-Huellet Group who have registered themselves with the National Electricity Regulator as an independent Power Producer. Through discussions with key role players in the renewable energy industry, it was not clear as to whether THG's Maidstone Mill was registered as a legitimate IPP. Contact was established with both production and general management at both the Group level as well as Maidstone Mill.

#### 2. Confirmed discussions with key individuals

Contact Person	Institution	Key Issue
Mark McNaughton	Tongaat Huellet	T-H generation capacity
Stuart Watson	Tongaat Huellet	As above
Dr Anton Eberhardt	National Electricity Regulator	Identification of IPP's

Jason Schaeffler	Iskhus Energy	Identification of IPP's
Mr Anthony Williams	Energy for Development Research Centre	Identification of IPP's
Dr Dieter Holm	Sustainable Energy Society of South Africa	Identification of IPP's

### 3. Commitment from NER for registration of new sources of electricity

Discussions were held between the National Electricity Regulator and team members from OneWorld Sustainable Investments with a view to securing commitment to the registration of new energy generators. Commitments as to the registration of new generators was made by Dr Anton Eberhard through the encouragement of project initiators to register the projects with the NER.

Detailed negotiations were embarked upon between AGAMA and the NER which further served to cement the commitment made by the NER.

## AUXILIARY TASK: FUNDING AND FUND RAISING

### A1. Develop value proposition for potential funders

1. Define Value proposition  
See Appendix 3
2. Powerpoint format proposal  
See Appendix 3

### A2. Identify potential funders by industry and interest area

1. List of key private sector and public sector funders that were approached for funding the off-set of the green premium for the WSSD project. Major constraints in securing the funding revolved around the concerns that there were not sufficient guarantees for publicity and media exposure at the key venues. A number of the major institutions canvassed indicated their preference for investment or participation in larger scale projects as opposed to once-off funding or donations to projects, irrespective of the importance or nature of the project.
2. It was evident that a great deal of caution still exists within the mainstream private sector funding agencies with regard to renewable energy and the potential for success within such an emerging industrial sector. A great deal of optimism with regard to the development

Funding Source	Nature of organisation	Proposal response
BP Southern Africa	Petroleum/Energy	Engaged with WSSD and has made prior commitments. May be interested in providing clean energy to Summit depending on nature of the project.
Sasol Limited	Synthetic Fuels	Sasol indicated interest in sponsoring the project in the initial phases. Their investment and sponsorship committee decided against participation based on their perception that they would

		need to confront major players such as Eskom and were not sure as to what Eskoms role in such a project would be. They indicated that they would be looking into investment
Tellumat South Africa	Energy instrumentation/metering	Interested in project but did not take it further. Were only prepared to fund if it provided access to further energy opportunities.
BodyShop International (UK)	Retail	Contact made with Anita Roddick. Initial interest was high but were not able to commit locally due to budgetary constraints. We pursued Anita Roddick as patron for the project.
Woolworths	Retail foods & textiles	Keen to fund but budgetary constraints were a problem in final commitment.
Altech	Hi-tech manufacturing	Keen to fund renewable energy projects. Insufficient publicity guarantees.
Nedbank	Financial services	Insufficient publicity guarantees and other commitments to WSSD. Keen to participate in RE projects at a later date.
WipCapital	Investment banking and financial services	Wip Capital indicated their interest in the funding of the project. Publicity guarantees were not satisfactory for them and they indicated then a preference for investment in larger scale generation projects or participation in a renewable energy fund.
Standard Bank Investment Corporation	Investment Banking	Substantive commitment made to WSSD and not further commitments could be made. Were keen to participate in financing at a later stage.
Old Mutual Asset Management	Investment Banking	Keen to fund such initiatives through their range of funds. Not keen on short term demonstration projects but keen to develop WSSD profile. Would prefer larger scale infrastructure projects in the RE arena.

Rabo Bank International	Investment and Retail Banking	Initially open to funding but felt that they would prefer larger opportunities in the development of large scale RE projects with clear CDM and carbon trading links.
Investec Asset Managers	Investment Banking	Initially keen to define participation in the Summit but later reverted to preference for large scale investment opportunities. Keen to establish a renewable energy fund.
Rand Merchant Bank	Investment Banking	Were keen to play a higher profile role in WSSD but felt sponsorship was too onerous at this stage. Would prefer to look at large scale investment opportunities.
ABSA Limited	Retail banking	Not keen to donate money or sponsor events. Were prepared to look at larger scale energy projects that would provide investment opportunities. Felt that the media coverage and publicity coverage would be insufficient.
Chase Environmental Services (UK)	Environment and development consulting services.	Initially interested in WSSSD sponsorship but later preferred to invest in actual project development within South Africa.

**Annexure L. – Opportunities for Partnership**

# Green Power for the World Summit on Sustainable Development

*Opportunities for Partnership*

*June 2002*



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## **Green Power for the World Summit on Sustainable Development**

**AGAMA Energy has been appointed by The Department of Environmental Affairs and Tourism to lead a project aimed at supplying the main WSSD conference venues with green electricity for the duration of the Summit. The project is funded by USAID.**

### **Project partners**

Expertise is drawn from a range of organisations and individuals who will contribute to the success of this pioneering initiative:

- OneWorld Sustainable Investments – investment and development facilitation, sourcing of energy, fund raising
- GEO cc – Sourcing of energy, monitoring, measurement, auditing and reporting
- Ramboll – Technical development, trading and sourcing
- Charles Dingley – tariff design, Tradable Renewable Energy Certificates development, sourcing of clean energy



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**The project is set to have a significant impact on the renewable energy environment within South and Southern Africa, and it is intended to attract significant international support and attention**

### **Our objectives**

- To facilitate the supply of green electricity to the conference venues from variety of sources, both locally and internationally
- Work with the regulators to create the right environment for the introduction of new generation sources into the national grid
- To provide the necessary technical, monitoring and measuring mechanisms to ensure that the electricity reaches the venues and is certified as green by the National Electricity Regulator
- To stimulate significant local and international interest for investment into the emerging renewable energy industry from the investment community
- To introduce a new regime for the potential trading of renewable energy into the national grid



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**A key objective of the project is to secure sufficient and reliable supply of *certified* green electricity to the venues.**

### **Some key considerations**

- Green electricity (solar, wind, bagasse, hydro) is available within the national grid but not recognised
- These sources of energy are not valued correctly, both to producers and consumers
- Subsequently, green electricity will need to be priced properly

### **Addressing tariff differentials for green electricity**

- There will be a difference between the current Eskom / City Power tariff versus the green sourced electricity
- This tariff differential will need to be off-set through a number of mechanisms
- The preferred choices are to secure funding for the differential and to elicit “in kind supply” from generators of the electricity





OneWorld  
Sustainable Investments

**Through partnering with the project, your organisation stands to gain a great deal of high profile publicity, and potential access to further opportunities in the emerging renewable energy market**

## THE WSSD GREEN POWER VALUE PROPOSITION

Through active support for, and involvement in,  
*The Green Electricity for the WSSD Project,*  
your organisation will be part of a high profile event that will make history in South Africa and place your organisation in a position as a leader in championing sustainable energy solutions for South Africa



## **Annexure M. – 10% Green Power by 2012 –Plan for Investment Conference**

# **10% GREEN POWER by 2012**

## **Delivering new green power onto the grid**

### **Trade and Investment Fair**

**TOWARDS A LARGE-SCALE IMPLEMENTATION OF NEW GREEN  
POWER GENERATION CAPACITY IN SOUTH AFRICA**

**13 and 14 March 2003  
Cape Town**

*Prepared by Agama Energy, OneWorld Sustainable  
Investments and Genesis Eco-Energy*

## 1. Background

The launch of the South Africa Government's Renewable Energy White Paper presents the opportunity to engage with a range of stakeholders in the development of green energy for the South African market.

The context is created for the development of renewable energy sector by these key developments including:

- The White Paper on Energy Policy establishes a conducive policy framework for the implementation of large-scale renewable energy generation capacity (available on [www.gov.za](http://www.gov.za))
- South Africa needs new generation capacity within the next few years (estimated earliest date 2007) to meet the projected growth in demand
- The DME report on Bulk Renewable Energy Independent Power Producers in South Africa (Boldt J et al, 2001) recommends a set-aside programme of 200 MW for new renewable energy generation projects
- The DME policy on renewable energy sets out a target of 2000 MW of RE generation capacity over the next decade (as per the recently released White Paper on Renewable Energy).

Policy is essentially in place and there is a sense that Renewable Energy should be implemented. However, while nuclear and gas projects pipelines are well-established, there is no effective mobilisation around the delivery of bulk Renewable Energy (RE) capacity to complete the mix of generation capacity.

To date the Darling Wind Farm has pioneered an IPP model as a National Demonstration Project but this project will only deliver 5.2 MW in Phase 1 (and 13 MW in the longer term) and this after four years of effort.

Within this context, and the growing investor interest in both the conventional (gas) as well as renewable energy sector in South Africa, a two-day investment conference and trade fair, will be convened. The aim will be to answer, and develop an investment master plan around, the following question: How will South Africa implement an average of 200 MW of new renewable electricity generation per annum over the next decade?

## 2. Workshop description

A two-day conference will be hosted by AGAMA Energy and its partners, and convened at the Spier Hotel, Cape Town. This event will be aimed at legislators, regulators, IPP investors and operators, financiers (both large banks and investment houses, as well as venture capitalists), contractors, project managers, technology providers and Metro managers.

**Purpose:** A number of key objectives have been defined:

- to develop an investor's "roadmap" and investment master plan for the delivery of new green generation capacity of the same order as nuclear and gas programmes;
- to host an investment fair for "matching" developers of IPP's and RE technologies, with investors, funders and other potential business partners; and

- to provide and opportunity for key role players, including investors, to network and agree on clear outcomes that will facilitate and fast track the development of the renewable energy sector in South Africa.

**Dates:** Thursday 13 and Friday 14 March 2003

### **Format**

The format of the conference will focus strongly on an element of input and scenario creation / description for all role players in order to determine the current state of play and future desired state for the industry / market in South Africa.

The conference will be run more as a workshop with clearly defined outcomes as above, allowing for maximum input and interaction between all parties concerned.

The conference will be preceded by a 6 month lead up phase (September 2002 to February 2003) in which key identified stakeholders will participate in a series of three workshops aimed at developing straw dog investment and development scenarios for debate and discussion at the workshop. This process will be driven by the lead agents for the conference, Agama Energy, along with appointed sub-contractors or business partners. These briefing sessions and workshops will be clearly defined in the planning process over the next 2 months.

The final project plan will detail the programme format as agreed with the lead conference organisers and their partners.

A suggested format for the conference / workshop is proposed in order to ensure the stated objectives are met:

- **Inputs and perspectives on the regulatory frameworks and conditions (1/2 day):**
  - Intro of policy framework - DME
  - Demand projections - DME/ NER
  - Regulatory framework – NER
  - Legislative considerations – AAE?
  - Human resources
  - Empowerment
- **International energy and investment trends (2 sessions of 30 min each, including discussion time)**
  - International experience – European Wind Energy Association / EU
  - Investment company / fund / bank – Rabobank or Merrill Lynch
- **Resource – where is the resource and at what scale – CSIR / DME / EDRC (2 sessions of 20 minutes each)**
- **South African Perspectives and imperatives – Making RE work for South Africa (4 sessions of 15 minutes preceded by working papers to be circulated)**
  - Access to the market (SAPP)
  - The green electricity market in southern Africa

- Current status of existing capacity and new projects (DARLIPP and SABRE-Gen)
- Technical considerations: the energy mix, engineering, project management, development of IPP's (set-up, structuring, financing)
- **Financing RE in South Africa (3 sessions of 20 minutes each)**
  - Financing / investment concerns – One World Sustainable Investments / Rabobank
  - Creating an investor friendly environment – key criteria – Merrill Lynch
  - CDM – Steve Thorne (SSN Project) and Ash Sharma (ESD)
- **Workshops: 3 breakaway sessions will be held focussed on key elements as identified by the speakers and participants during the conference. These sessions will be 1 ½ hours duration each. Outcomes will contribute to the development of a clear investment master plan and declaration at the end of the conference.**
- **A dinner hosted by the Minister of Minerals and Energy will take place on the Thursday evening. This will act as a key networking event.**
- **During the workshop, technology developers, project developers and potential fund seekers will have the opportunity to display their projects. It is envisaged that this will take place during the conference and during tea breaks, lunch breaks and evening breaks.**
  - The objective will be to allow investors and developers to network with a view to matching projects with financing and business development partners, thus creating an effective "match making " opportunity
  - A detailed layout will accompany the overall project plan.

### 3. Keynote speakers

It is envisaged that a number of keynote speakers will provide the context for the development of a clear master plan for investment into RE in South Africa. The following key people will be invited:

- Phumzile Mlambo-Ncuka: Minister of Minerals and Energy
- Alec Irwin – Department of Trade and Industry
- Trevor Manuel – Minister of Finance
- National Electricity Regulator
- Hermann Scheer – European Union
- SADELEC
- Rabobank
- Siemens Limited

## 4. Endorsements / supporters

In order to secure the right high level profile for the event, endorsements will need to be forthcoming from a range of sources with a sufficiently high standing profile in the investment and energy communities. The following anchor endorsements will need to be secured:

- Department of Minerals and Energy, and Department of Trade and Industry
- Central Energy Fund
- WESGRO and the National Business Initiative
- Earthlife Africa and/or Greenpeace
- Industry Associations: SESSA / ISES / SAWEA
- ESI Africa
- Local finance house: to be confirmed

## 5. Funding

Funding for the conference will need to be secured in order to fund the venue hire, catering, travel and accommodation, organising expenses (conference organisers), publicity, and logistical support (audio-visual & media). A core objective of the organising team will be to secure additional funding for the overall conference.

It is envisaged that the conference set-up costs will amount to R 425 000.00 which will include costs for travel from overseas for a limited number of international delegates.

Potential sponsors have been identified as:

- European Union
- USAID
- DME
- ISES
- Nedbank
- Investec
- Shell
- Standard Bank.
- Rand Merchant Bank.

Funding will need to be secured for the conference organising team. This amount is included in the R425 000.00 quoted above.

## 6. Conference organisers

The conference will be organised under the auspices of Agama Energy who will be the lead organiser. All contractual arrangements by third party suppliers and sub-contractors will be through the lead organisers.

## 7. Delegate and invitee profiles

In order to ensure that the conference and trade fair is successful, the mix between local/international, business, government, civil society and investment partners will need to be carefully managed. This has been covered to some extent.

The total number of delegates to the workshop / conference is envisaged to be not more than 80. In addition, technology companies wanting to participate as display vendors only may increase the numbers to the region of 100.

The following profile is considered as key to the success of the event:

- Local to overseas investors including banks, investment houses, funds, venture capital groups, utility operators and technology companies, private investors: 60/40 making up 60% of the delegates
- Central and regional government representation limited to key agencies responsible for roll-out of renewable energy (10% of delegates)
- Metro or Unicity Executive limited to 20% of delegates
- International development agencies and/or donor agencies, including EU, World Bank, PCF, USAID, etc 5% of delegates
- Civil society and NGO participation will total 5% of delegates.

A list of the target audience and invitees will be developed by the project steering committee.

## 8. Other considerations

In order to ensure the success of the Conference and investment fair, a number of key dependencies have been identified. These are listed as:

- Check for duplication of other conferences
- Check for clashes with dates
- Check integration with ISES SEPCO initiative and EU Synergy Project
- Ensure that conference communications clearly define the conference as workshop and investment matching programme
- Ensure that potential conflict between various commercial parties and project developers to not create a competitive scenario and thus jeopardise the effectiveness of the conference or hamper participation by various organisations.

## 9. Key Action Items

The following immediate action items have been identified in order to facilitate the development of a comprehensive conference plan based on this draft:

- Appoint conference organising or steering committee;
- Draft comprehensive preliminary project plan and budget;
- Secure funding for both conference organisers as well as the conference itself;
- Secure services of conference organisers in terms of criteria identified by the overall project steering committee
- Finalise project plan and initiate conference organisers.