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Renewable Energy



Delivered to Your Door

The Cost of Conventional Electricity



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Cost to generate conventional electricity \approx 14c per kWh

Not the true cost-need to factor in:

Cost of replacing aging infrastructure (new coal energy 60c-70c per kWh)

The Environmental cost

- Global warming (carbon emissions)
 - Eskom supply: 1 kWh \approx 1 kg CO₂
- Pollution (e.g. acid rain, ash, smog)
- Community health
- Finite resource

Cost of carbon \approx €10 - €30 per ton CO₂ \approx 1c-3c (ZAR) per kWh.

The Cost of Renewable Electricity



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Renewable Energy Feed-in Tariffs:

Technology	Unit	REFIT
Wind	R/kWh	1.25
Small hydro	R/kWh	0.94
Landfill gas	R/kWh	0.90
Concentrated solar	R/kWh	2.10

Why buy Renewable Energy when it costs more?



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A. Because you have to (Legislated)

B. Because you want to (Voluntary)

- Good business sense- economic pressure, long term sustainability
- Moral obligation “It’s the right thing to do!”
- Foresight- children’s legacy

Funding Renewable Energy



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Buying Future Generation

- Buy a renewable energy generator
 - Residential PV
 - Small scale wind turbine
 - **SWH**
- Buy Shares in a Renewable Energy Generator
- Pay a premium on your energy purchases towards the Power Utility's investment in Renewable Energy Generation
 - Contribution Based/("Fund Model")
- Taxes

Buying Past Generation

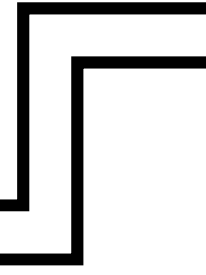
- Regular monthly payments for Renewable Electricity already generated
 - Consumption Based/Supply Model
- Provides income stream for investors
- Income covers interest and capital payments, operating costs, taxes and profit for investors
- Long term Power Purchase Agreement (PPA) - contract with primary purchaser

Network Arrangements

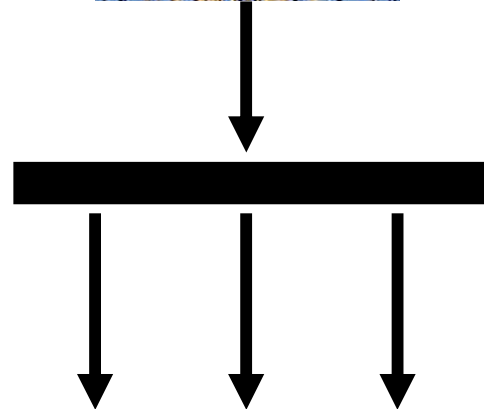


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It is impractical to lay separate powerlines from R/E sources to consumers



Consumers

Renewable electricity generally injected onto the utility electrical grid

Which one is the Green Electron?



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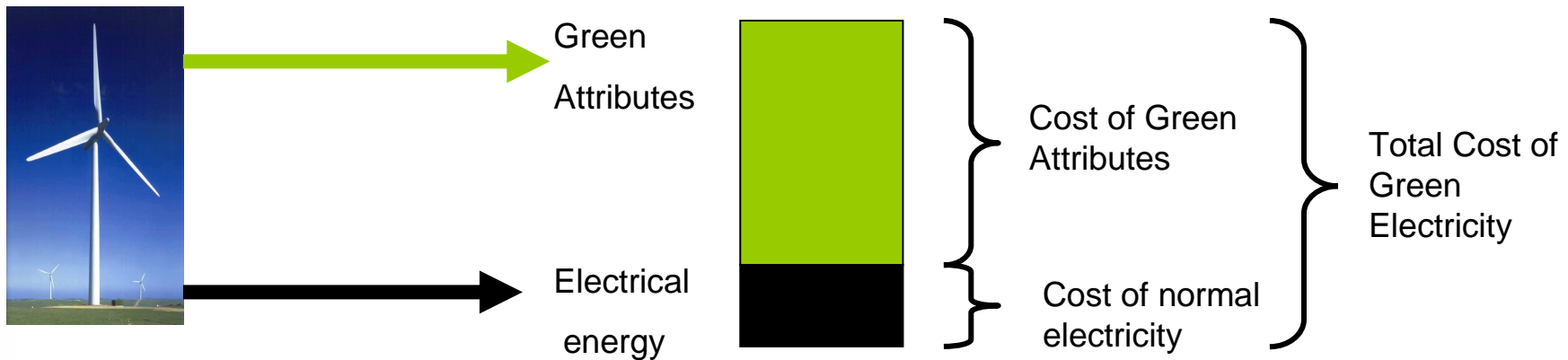
Renewable Energy /Green Electricity Certificates!

Components of Renewable Electricity



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Green characteristics and electric energy are separated, the green attributes represented by a financial mechanism called a “Renewable Energy” or “Green Electricity” Certificate

Green Attributes of Renewable Energy



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Green attributes include:

- Reduction in CO₂, SOX, NOX, particles
- Generation from renewable source
- Local health benefits
- Job creation and local economic benefits

Certificates- Definition



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“A standardised official record proving that a specified amount of electricity has been generated from specific sources”

Renewable Energy Certificates



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Renewable Energy Certificates

- A financial mechanism representing intangible assets
- Usually exists only as an electronic record
- Represent all the benefits of the renewable energy and excludes the supply of the electrical energy itself.
- Purchasing Green Electricity Certificates transfers the right to claim the benefits of the Green Electricity from the seller to the purchaser.
- Usually 1 certificate=1 MWh
- Separate from Carbon Emission Reduction certificates (CER's)
- Usually transferable/tradable



The Association of Issuing Bodies
BASIC COMMITMENT



Principles and Rules of Operation
for the European Energy Certification System

Version Release 4
Date 22 March 2007

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The AIB Pro



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Use of EECS Certificates

Certification of the quality and method of energy output provides an efficient mechanism for accounting for: the quality of energy supplied to consumers and its method of production; the progress made towards targets for the use of sustainable energy technologies; and the production and consumption of energy for the purposes of stimulating investment in sustainable energy plant. Moreover, certification enables a value to be accorded to specific types of energy output and traded separately from the energy itself.

For a system of energy certification to discharge these functions effectively, users of the Certificates – producers, traders, suppliers, consumers, NGOs and governments – must be satisfied that the Certificates provide reliable evidence of the qualities to which they relate. The EECS framework functions to ensure that all such users have confidence in the Certificates issued and processed by AIB Members under EECS.

The AIB PRO- Purpose



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Purpose of the PRO

The PRO governs the European Energy Certificate System (EECS) – a commercially funded, integrated European framework for issuing, holding, transferring and otherwise processing electronic records (EECS Certificates) certifying, in relation to specific quantities of energy output, attributes of its energy source and/or the method and quality of its production.

The purpose of the PRO is to secure, in a manner consistent with European Community law and relevant national laws, that systems operating within the EECS framework are reliable, secure and inter-operable. The implementation, under the PRO, of harmonised standards for issuing and processing EECS Certificates enables the owners of EECS Certificates to transfer them to other Account Holders at both the domestic and international level.

AIB Pro Instruments



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- Guarantee of Origin Certificates
- Renewable Energy Certificates
- Disclosure Certificates
- Combined Heat and Power Guarantee of Origin Certificates

The AIB Pro- Core Principles



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The arrangements for issuing, transferring and Redeeming EECS Certificates should be such as to eliminate the possibility of more than one EECS Certificate being issued, registered or Redeemed in respect of the same megawatt hour of energy.

The arrangements for issuing EECS Certificates should be such as to eliminate the possibility of EECS Certificates being Issued in respect of the same energy and attributes for which other tradable Certificates (other than EECS Certificates of a different type where specifically permitted by the PRO) have or will be issued.

AIB Certificate Definition



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Certificate

a certificate, record or guarantee (in any form including an electronic form) in relation to:

- (a) the energy source from which a quantity of energy output is produced, and/or
- (b) attributes of the method and quality of the production of a quantity of energy output;

Life Cycle of Certificates



The life cycle of an EECS Certificate encompasses three phases: issuance, transfer and redemption:

- Electronic EECS Certificates are issued on registries operated by, or on behalf of, AIB Members in respect the energy output of Production Devices registered in connection with national legislation or, otherwise, specifically for the purposes of an EECS Scheme.
- These Certificates may be transferred from the account of the producer to that of a trader, and so on; either within the country of origin or to other registries operated by, or on behalf of, AIB Members across Europe.
- Redemption is the mechanism whereby the EECS Certificate is removed from circulation. Redemption occurs at the point at which the value of the Certificate is realised. Examples of circumstances in which the Redemption of an EECS Certificate may occur include: in connection with payment from a consumer in recognition of the qualities it represents; in connection with the award by government of a financial incentive, such as a tax rebate; or by way of discharge of a contractual or legal obligation. The PRO provides for EECS Certificates in respect of the same quality attributes and the same energy output to be Redeemed on only one occasion.

Certificate Redemption



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Redeem

to remove an EECS Certificate from a Transferables Account at the request of an Account Holder for the purposes of enabling the Account Holder (whether on its own behalf or on behalf of another person):

- (a) to realise such real or intangible benefits as may be accorded to it; and/or
- (b) to comply with a legal obligation;

(and Redemption shall be construed accordingly);

Domain Protocols



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Under the PRO, each country defines a set of rules under which the local certificate system operates. These sets of rules are known as “Domain Protocols”

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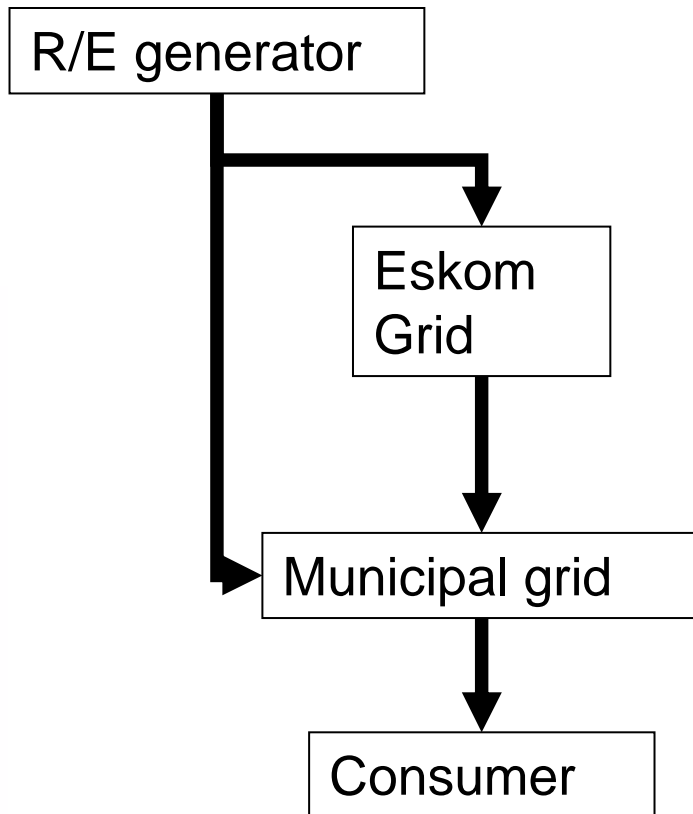
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Financing R/E in South Africa



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Green benefits sold together with the energy

R/E generator could sell green electricity:

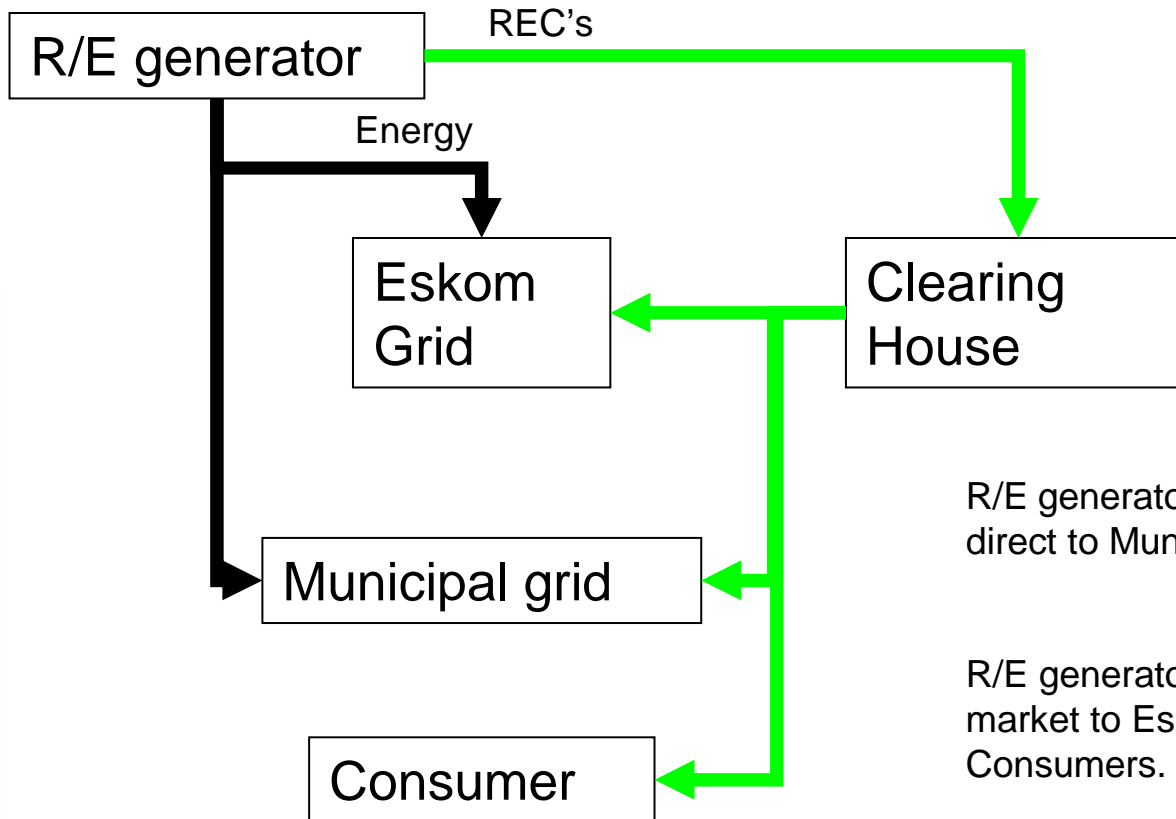
- Direct to Consumers (wheeling through Municipal and Eskom's grids)
- Directly to Eskom or to Municipalities who recover the R/E premium from all consumers (REFIT)

Financing R/E in South Africa



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Green benefits sold separately to the energy

R/E generator sells energy to Eskom or direct to Municipalities

R/E generator sells REC's on the open market to Eskom, Municipalities or Consumers.

Purchases could be mandatory or voluntary

Darling Wind Farm National Demonstration Project



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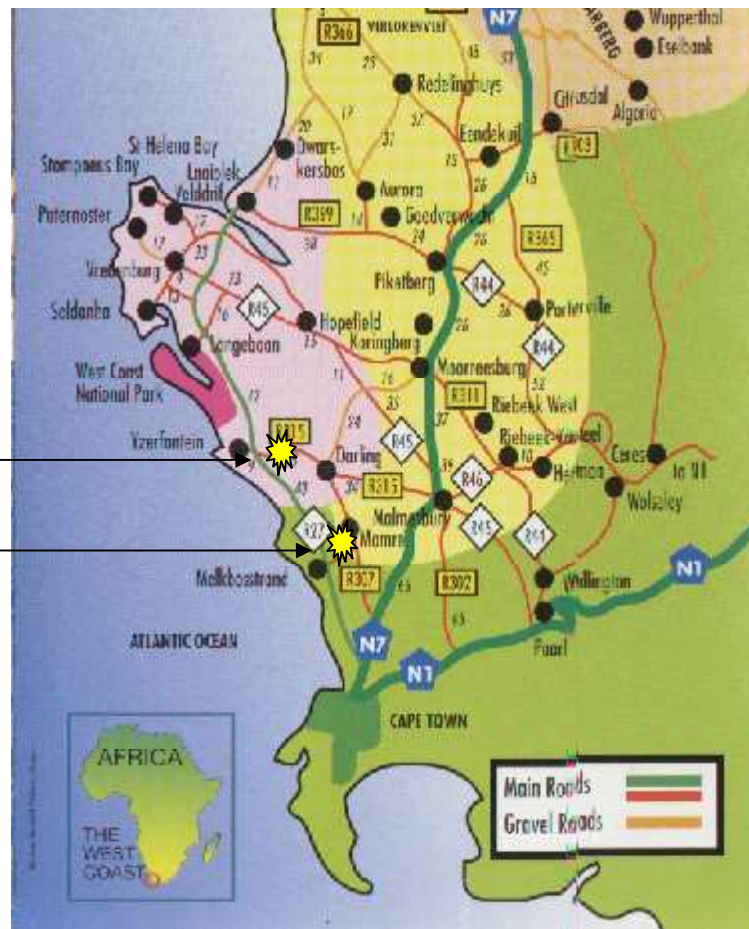
Project Location



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Darling Wind Farm
Intake Point, Atlantis

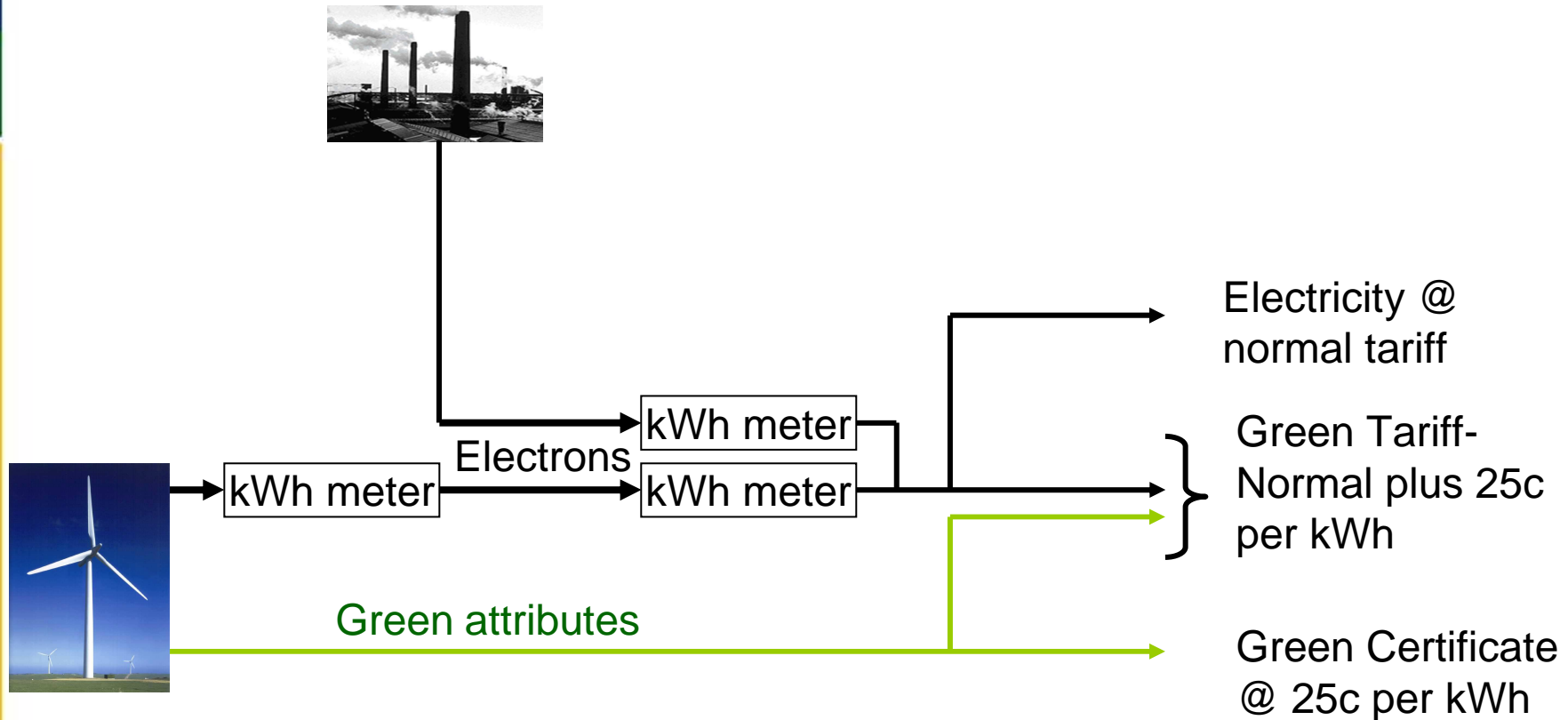


Energy and Green “flows”



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Green characteristics and electric energy are separated



GREEN ELECTRICITY CERTIFICATE PURCHASE STATEMENT

This certifies that
JMC HOLDING COMPANY
trading as
ACME

during the period ?? JANUARY 2008 to ?? JANUARY 2009
has purchased FIVE HUNDRED AND THIRTY SIX THOUSAND (536 000) kWh
of City of Cape Town Green Electricity Certificates

IN SUPPORT OF A SUSTAINABLE FUTURE
Energy resource: *Wind (Darling Wind Power (Pty) Ltd)*

.....
DATE

.....
SIGNATURE

Business partner number: 33620 4512
Account number: 120 552 0147

Terms and conditions apply - not negotiable or transferable



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Credibility

Strict certification and audit process required to authenticate that:

- Source of electricity is renewable
- Seller does not sell more green electricity/certificates than has been generated
- Green benefits are not sold twice

No formal certificate system yet in RSA

Cape Town to follow core international principles. (AIB)

Cape Town's Green Electricity Certificates



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- The purchase of a Renewable Electricity Certificate represents a financial contribution by the purchaser to cover the premium that the City has paid for Green Electricity which has already been generated by the Darling Wind Farm and purchased by the City of Cape Town.
 - In units of kWh's or fractions thereof
 - Indefinite shelf life
 - Non negotiable/transferable
 - Recorded in SAP Materials management (Stores Control) system
 - No unique certificate numbering
 - Will not sell more than have been generated /purchased
 - Protocol: City of Cape Town Green Electricity Certificate Trading System
 - External audit of Transactions



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Thank you