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## Protocol for registering renewable energy sourced generation devices

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### Bagasse-based cogeneration facilities

Version 5

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## Definitions and Accronyms

AIB	Association of Issuing Bodies
CD	Combustion Declaration
CRD	Central Registry Database
EECS	European Energy Certification System
MWh	MegaWatt hour – a measure of electrical energy equivalent to one hour of output at an output power of one MegaWatt.
RECs	Renewable Energy Certificate
RED	Renewable Energy Declaration
RES – E	Renewable Energy Source – Electricity
NCV	Net Calorific Value – the energy content per unit mass of a fuel discounted from the Gross Calorific Value (GCV) for moisture content of that fuel.
PD	Production Declaration

## 1. Background

This report outlines the development of the bagasse-based cogeneration component of an interim domain protocol for South Africa in line with the Association of Issuing Bodies 'Basic Commitment' and 'Framework Domain Protocol' documentation and the second version of the Voluntary Green Power trading market in South Africa: Pilot Project Scope. The protocol was informed by a device registration audit of the Tongaat Hulett's Group's Amatikulu Sugar Mill and broadened to encompass envisaged differences at other Bagasse-based renewable energy production devices in South Africa. It is anticipated that further Bagasse-based facilities will be registered according to this protocol in the near future. It is essentially a methodology for auditing Bagasse-based cogeneration plants to satisfy production device registration requirements on the basis of the above documentation and with a view to aligning these with the role of a national Renewable Energy Certificate Issuing Body.

Nano Energy was contracted to develop this protocol, conduct the production device registration for the Amatikulu Mill and issue certificates for renewable energy exported from the facility for the purpose of the Voluntary Green Market Pilot Project Launch on the 19<sup>th</sup> of April 2005.

The set of definitions and criteria as set out in the European Energy Certification System's (EECS's) Basic Commitment have been followed in developing this protocol component. Any deviations from the Basic Commitment requirements have been noted. The Bagasse specific component of the requisite South African domain protocol is a first step towards and contributes to the development of the South African protocol. The domain protocol sets the rules that are supplementary to the Basic Commitment.

## 2. Bagasse-based cogeneration protocol

The process required to be followed prior to the issuing of certificates as detailed in Article 3 of the EECS Basic Commitment requires:

- Identification of the domain within which the market participants are commercially active.
- Each RES-E generator must gain registration for the production device (see chapter 3)
- Submission of a Renewable Energy Declaration (RED) by the generator or aggregator acting on its behalf to the issuing body seeking registration as a RES-E.
- Assignment of a unique identifier to the production device.
- An additional requirement has been included to ensure that suitable reporting processes and data collection is in place at the device to ensure suitable transfer of this to the Issuing Body to enable the issuing of certificates.
- Acceptance of the RED by the Issuing Body.

This protocol details the audit requirements for the Issuing body to follow in ensuring that the RED deposited by a Bagasse-based generation facility conforms to the requirements of the EECS Basic Commitment and the South Africa Domain Protocol.

### 2.1. Domain definition

For the purpose of these activities the domain has been defined as the South African electrical distribution and transmission networks referred to for example in the Bagasse Cogeneration CDM Methodology as the 'exporting grid'.

### 2.2. Production device identifier

The EECS Basic Commitment suggests an 18 digit device reference be recorded in the Central Registry Database (CRD). An algorithm has been chosen to assign unique South African device references. The device registration shall be composed of:

- domain of origin,
- installed electrical capacity of the device(s) generating the green electricity in kVA,
- date of device commissioning or of first operation in current configuration,
- technology code ('11' – Bagasse is an agricultural by-product)
- issuing body identity
- a check integer as a check for reference authenticity.

### 3. EECS Requirement for device registration

The European Energy Certification System outlines the following requirements for registration of a RES-E:

A RES-E Generator or a Production Aggregator acting on behalf of a RES-E Generator wishing to receive Certificates for the electrical output from a RES-E Production Device shall first gain Registration for that Production Device from the Issuing Body responsible for the Domain within which the Production Device lies by making a Renewable Energy Declaration (or RED) to the Issuing Body. Any Production Device that is not so Registered may not be Issued with Certificates.

A Renewable Energy Declaration shall state that the installation fulfills the criteria set out in this Basic Commitment and relevant Domain Protocol. The RED must have a period of validity limited according to the Domain Protocol for the Domain in which this Production Device is registered but will in any case be no longer than is stipulated in Annex 4 (Monitoring regime) to this Basic Commitment, after which time it must be re-submitted. Failure to do so will result in cessation of certificate issue for this Production Device. The criteria and the procedure for the RED may change over time.

A Renewable Energy Declaration shall include:

- A.) The name, address, contact details (including person responsible, phone, fax and e-mail) and Issuing Body for that RES-E Generator or of a Production Aggregator acting on its behalf;
- B.) The account into which the Certificates are first to be transferred upon issue;
- C.) The location of the Production Device;
- D.) The location and detail of the export and, where appropriate, import meter(s);
- E.) All possible sources of fuel to be converted into electrical energy by this Production Device, whether or not this is renewable,
- F.) The type of generation technology in place at this Production Device, from the agreed list as set out in Annex 2 to the AIB Basic Commitment [Bagasse is an agricultural by-product – code ‘11’];
- G.) The installed capacity of this Production Device. This is the “nominal capacity” (the maximum capacity obtainable under continuous operation which is usually determined by the manufacturer’s specification and often appears on the “nameplate” of the equipment and need not relate to any operational reality). “Nominal capacity” is a characteristic of a particular class of equipment considered in operation, and for prime movers is measured in kW on the shaft. Where it refers to a power station (kW or kVA), it is the arithmetic sum of the nominal capacities of the machines of the same type (e.g. steam, gas turbine, hydro), and normally includes the main and auxiliary generators of all generator sets including standby generator sets. Values of kVA and cos(j) should also be recorded where these are available;
- H.) The date of commissioning of this Production Device;
- I.) Any schemes associated with any Public Support that are or have been received in addition to Certificates by this Production Device, together with an indication as to whether they are currently being received;
- J.) A guarantee that the RES-E Generator owning this Production Device will not during the period of its Registration and for the same unit of electrical energy receive tradable evidence such as certificates which represent the benefit of renewable electricity generation from both this and another similar system that similarly certifies the origin or represents the benefits of the associated renewable electricity and can be exchanged for financial support;
- K.) A diagram showing the Production Device, the location of export meters used for metering its generation and of transformer substations at the plant site. If there are generating auxiliaries for the Production Device and/or import meters for metering their demand these shall be also shown on the diagram; and
- L.) Any additional information required by the Issuing Body as contained in the Domain Protocol.

A RED template for South African Bagassed-based facilities is included as Appendix B.

It is furthermore stated that:

Should any planned or unplanned change to a Production Device, including changes to any Public Support received by it, render the statements made in the RED inaccurate, then the corresponding RES-E Generator or the Production Aggregator acting on its behalf shall:

- Inform the appropriate Issuing Body prior to planned changes coming into effect or immediately where such changes are unplanned; and
- Not receive Certificates in association with this Production Device other than in its original state until it has been re-Registered by the Issuing Body.

Each Production Device shall be assigned a unique identifier.

The current details as set out in the Renewable Energy Declaration of each Production Device that has been Registered shall be made available in electronic form to each Participant.

The Issuing Body shall publish clear and unambiguous procedures for the Registration of Production Devices. These procedures shall require that the RES-E Generator or the Production Aggregator acting on its behalf:

- a) Completes and provides to the Issuing Body a RED;
- b) Will permit the Issuing Body to inspect the Production Device and such records as it considers to be necessary to verify the authenticity of the RED and that such inspection may be conducted without prior announcement;
- c) Requests an account on the CRD where the issued Certificates for the Production Device will be deposited;
- d) Discloses details of any past infringements of Domain or inter-Domain agreements regarding Certificates and including the Basic Commitment and any Domain Protocol by itself or by any subsidiary, parent or related undertaking;
- e) Provides details of an officially endorsed source of meter readings, the means of collecting these, approval for their collection and accepts liability for the delivery, quality and accuracy of these meter readings; and

If a RES-E Generator seeking Registration of a Production Device meets the criteria for participating then the Issuing Body shall accept the application.

#### 4. Device registration inspection methodology

The issuing body can appoint a production registrar for the purpose of initial and periodic device inspections. For the purpose of the initial device inspection for first registration of the device as a RES – E generator the Production Registrar as appointed by the Issuing Body shall:

- Send a request prior to a site visit for the following documentation to be available on site:
  - documentation for the preparation of the Production Declaration including specifications for the device(s), the meters to be inspected and internal measurement methodologies
  - documentation for the preparation of the Combustion Declaration
  - any documentation supporting data to be supplied in completion of the Renewable Energy Declaration by the device owner.
- Send a RED template (included as Appendix B) for the device owner to prepare for the device inspection and subsequent lodging of the RED with the Issuing Body.
- Conduct an on-site device inspection accompanied by suitably qualified device owner members of staff in order to verify data to be specified in the RED.
- Identify device owner staff members to be interviewed regarding relevant data collection methodologies and procedures
- Satisfy itself that suitable procedures and data collection are in place to provide an accurate RED and reliable Combustion and Production Declarations.

## 5. Reporting process and data collection

The declaration of production from a device for the purpose of issuing certificates must make a statement both of the volume of electrical output to the exporting grid by the device and of the proportion of electricity which has been generated from renewable resources. The statement of electrical export is to be deposited with the Issuing Body monthly and is referred to as a Production Declaration (PD). It is furthermore required that this proportion be calculated by reference to the energy content of the renewable (Bagasse) and non-renewable (Coal) fuels. This is accomplished by the device owner preparing and submitting a Combustion Declaration (CD) to the Issuing Body. The issuing body must satisfy itself that systems and procedure are in place at the device or facility for data of a suitable resolution to be captured and transferred to the issuing body in accordance with preparation of monthly CDs and PDs.

The maximum quantity of renewable energy is then calculated as follows:

$$E_{RES} = \left[ \frac{\text{Mass}^{RE} \times \text{CalorificValue}^{RE}}{(\text{Mass}^{RE} \times \text{CalorificValue}^{RE}) + (\text{Mass}^{Non-RE} \times \text{CalorificValue}^{Non-RE})} \right] \times \text{Output}$$

The sophistication of information systems varies markedly between various sugar mills. The following documentation will therefore be used for the process of issuing certificates to the device owner's account in the CRD:

- Total monthly Coal consumption. The Coal usage return documents form part of the document set that can be requested by the IB as outlined in the basic commitment. Calibration of the Coal bucket instrumentation is to be provided to the Issuing Body as part of the RED.
- Monthly Bagasse produced along with weighted average Net Calorific Value. The latter again form part of the document audit compliment. Where it is not directly measured, the NCV can be calculated from the 'Ash % Cane', 'Brix % Bagasse' and 'Moisture % Bagasse' figures. Bagasse produced is used as a proxy for Bagasse burned after subtraction of material exported. The buffer effect of the Bagasse bunker is assumed to be negligible over the period of one month.
- Monthly Bagasse exported to be subtracted from the monthly combustion figures.
- The monthly Coal consumption, Bagasse production and Bagasse export form the Combustion declaration for the device. The possibility of importing waste wood chips has arisen in the past and may do so again. In that case quantities of wood chips burnt will also be reported.
- Total monthly electricity produced at the facility. Internal consumption of electricity is determined by subtracting the electricity exported from this total. When the total electricity produced is used as the 'output' in the equation above, it yields the total amount of 'green electricity produced' and therefore the maximum amount of green electricity that can be exported. In the case of exported electricity exceeding the renewable source-based proportion of internal production the electricity exported in excess of this green amount will be considered non-renewable.
- Monthly electricity exported as read at the internal 4 quadrant meter and verified by data from the Eskom Customer Executive. This number is effectively the Production Declaration for the device and is forwarded by the metering service provider to the independent market operator and the operator of the CRD for capture in the raw data hub.

For Sugar Mills data is often presented on either a 4 or 5 week 'monthly' basis. This is sometimes referred to as a 'milling month'. This does not necessarily coincide with the calendar month upon which the production declaration is based. For the purpose of the consumption declaration this period will be taken as equivalent to the calendar month in question.

## 6. Conclusion

The Issuing Body shall provide a decision on the acceptance of the RED lodged by the device owner within 10 working days. This shall be provided to both the device owner and to market participants with a period of comments on the RED and the decision of a further 10 working days being allowed. Thereafter the Issuing Body will provide final acceptance of RED and issue the device identifier and ensure that it has been captured in the CRD. If there are objections to the RED or its acceptance the Issuing Body may require the device owner to re-submit the RED for re-evaluation as per the above procedure.

## 7. References

AIB, 2004. EECS Basic Commitment (Release 1-2) 7 June 2004

AIB, 2004. RECS basic commitment Annexes Release 2.2. 31 January 2004.

AIB, 2004. RECS framework domain protocol

Morgan, K 2005. Voluntary Green Power trading market in South Africa: Pilot Project Scope version 2.

## 8. History of Versions

Version 1	16 <sup>th</sup> April 2005
Version 2	17 <sup>th</sup> April 2005
Version 3	19 <sup>th</sup> April 2005
Version 4	17 <sup>th</sup> May 2005
Version 5 (This report)	25 <sup>th</sup> May 2005

# Appendix A.

## Interim issuing body letter of acceptance

### Issuing Renewable Energy Certificates

#### Proposed approach to creating an interim body

By  
Jason Schäffler and Rob Short

The emerging voluntary renewable energy<sup>1</sup> market requires verifiable certificates that will be generated automatically as part of market settlement. This outline was written for the renewable energy industry in general and for suppliers, traders and consumers of renewable energy in particular. It proposes a means of enabling and therefore accelerating the onset of credible trade in these certificates in alignment with initiatives by the national government to stimulate the use of renewable energy. It has been prepared on the basis of nomination<sup>2</sup> of the authors of this outline by Amatola Green Power as the interim secretary to the Green Power Voluntary Market Guidance Committee (GPVMGC) to undertake the role of an interim issuing body (IIB) with a view to paving the way for the creation of an entity to fulfil this function on a permanent basis in the longer term.

The IIB will be a credible institution to issue renewable energy certificates (RECs) at the production devices based on recognised procedures similar to or at least compatible with those used in EU countries. The GPVMGC will do the appointment of the Issuing Body. The IIB Body will be responsible for the following:

- to follow all necessary procedures that will result in the Issuing Body being registered with a reputable oversight body
- to ensure that the Basic Commitment and Domain Protocol of the voluntary market are observed
- inspect all RES-E production devices that wish to participate
- Issuing, transferring ownership of and redeeming RECs
- Recording in a Central Registration Database (CRD) all issued REC's
- Appoint other bodies to assist the IB such as:
  - Production Registrar (PR) to verify production device's compliance
  - Auditing Body (AB) to audit the continued fulfilment of conditions for RECS registration.
  - Central Monitoring Office (CMO) to operate the CRD

All other systems for the operation of the voluntary green power market are in place to do verification and monitoring.

The steps required to put the IIB in place and which we will undertake include:

- developing and refining the IIB protocol,
- detailing business operation procedures of the IIB including linkage to an oversight body and
- developing the IIB business plan and assisting to raise funds to put the IIB in place for provision of the service.

We hereby accept the initial nomination to provide the role of the IIB in the voluntary green power market subject to:

- endorsement of the appointment by the GPVMGC and
- development and agreement upon a suitable pricing arrangement.

<sup>1</sup> This is energy converted from energy resources that are replaced at a rate greater than that at which they are extracted.

<sup>2</sup> The credentials of the authors, although paramount to their providing this service, are not discussed in this paper. Their brief Curricula Vitae are included as an appendix for those to whom they may be of interest.

## Appendix B.

### Bagasse-based facility Renewable Energy Declaration

[Device Owner] \_\_\_\_\_ wishes to receive renewable energy certificates for the Bagasse-based electrical output from [Device Name] \_\_\_\_\_. Registration is therefore sought for [Device Name] \_\_\_\_\_ in the South African Domain. This Renewable Energy Declaration (or RED) is prepared with the intention of declaring that the installation fulfils the criteria set out in this Basic Commitment and relevant Domain Protocol.

Period of validity: \_\_\_\_\_ from date of registration on the CRD. After this time a RED will be re-submitted. Failure to do so will result in cessation of certificate issue for this Production Device. The criteria and the procedure for the RED may change over time.

A.) Name:  
 Address:  
 Responsible person:  
 Telephone:  
 Fax:  
 Email:

Issuing Body:  
 Responsible person:  
 Telephone:  
 Fax:  
 Email:

B.) CRD Account Number: To be assigned  
 C.) Location of device  
 D.) Location and detail of export and import meters:

E.) Possible Sources of Fuel  
 F.) Type of generation technology Agricultural by-product – Bagasse  
 G.) Installed Capacity \_\_\_\_\_ MW (\_\_\_\_ MVA)  
 H.) Date of commissioning 19\_\_  
 I.) Public support schemes

J.) It is hereby guaranteed that:

[Device Owner] \_\_\_\_\_ will not during the period of its Registration and for the same unit of electrical energy receive tradable certificates which represent the benefit of renewable electricity generation from both RECS and another similar system and can be exchanged for financial support

K.) A diagram showing the Production Device, the location of export meters used for metering its generation and of transformer substations at the plant site. If there are generating auxiliaries for the Production Device and/or import meters for metering their demand these shall be also shown on the diagram.

\_\_\_\_\_  
**Name: for Device Owner**  
**Device Owner**

\_\_\_\_\_  
**Date.**