

**VALIDATION ASSESSMENT FOR APPROVAL OF CHANGES IN A REGISTERED  
PDD**

**INCAUCA S. A. FUEL SWITCH FROM COAL TO GREEN HARVEST RESIDUES  
CDM PROJECT  
(UNFCCC REGISTRATION REF. No. 1770)**

**INGENIO DEL CAUCA S. A.  
(COLOMBIA)  
MINISTRY OF INFRASTRUCTURE AND THE ENVIRONMENT (IenM)  
(NETHERLANDS)**

**VALIDATION ASSESSMENT No. CDM-VALOP-13-004-01**

**OCTOBER, 2013**

## VALIDATION ASSESSMENT



Project title:	Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project	Project No.:	UNFCCC REGISTRATION REF. No. 1770
Audit team:	Francy Ramírez ICONTEC Lead Auditor/Technical Expert	Organizational unit:	Instituto Colombiano de Normas Técnicas y Certificación – ICONTEC Calle 53 No.58-33 Bogotá - Colombia
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Version No.:	01	Last version date:	11/10/2013
PDD original Version No./ date	Version 16 27/03/2008	PDD Last version No./ date:	Version 17 09/10/2013
Sectoral scope	1 : Energy industries (renewable - / non-renewable sources) 4 : Manufacturing industries	Crediting period number	1st
		Duration of crediting period	15/10/2009 to 14/10/2016
Client:	Ingenio del Cauca S. A.	Client ref.:	CDM-VALOP-13-004

### 1 OBJECTIVE

ICONTEC was contracted by Ingenio del Cauca S. A. to perform a validation assessment of changes to the registered PDD of the project No. 1770 “Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project”.

The purpose of the validation assessment is to have an independent third-party assessment of the revision of the monitoring plan in order to request for approval by the CDM EB.

## **2 SCOPE**

The validation assessment involves the independent and objective revision to determine whether permanent changes from the registered PDD comply with the procedures of the UNFCCC.

Relevant rulings by the CDM Executive Board:

- CDM Project Cycle Procedure, ver. 05.0, paragraph 130 to 157.
- CDM Project Standard, ver. 05.0, paragraph. 209 to 228,
- CDM Validation and Verification Standard, ver. 05.0, paragraph. 247 to 282.

## **3 GHG PROJECT DESCRIPTION**

The project activity examined under this verification process involves the use of residues from the sugar cane harvest (called barbojo in Spanish) as a fuel with the aim to displace the coal use in the boilers at INCAUCA's facility.

To undertake this project activity, INCAUCA has carried out adjustments inside its facilities to meet the description provided in the PDD, as follows:

- Collection and Transporting system

As the verification team could verified in the onsite visit, currently, two ways exist to collect the barbojo from the sugar cane field after the harvesting. The first one is the hand-picking: the barbojo is collected manually by personnel contracted by INCAUCA to do it, then, this barbojo is transported to INCAUCA's facility by animal drawn vehicles. This collection system has a dedicated scale system with the aim to weight the barbojo delivered. The second one is the mechanical harvesting: the barbojo is collected using a lifting device, and then the barbojo is transported to INCAUCA's facility by tractors (a vehicle with several wagons). The barbojo collected by this system is weighted in the scale system located at the INCAUCA's facility entrance (different scale system used for hand-picking system).

Once the barbojo is in INCAUCA's facility, and is weighted, it is transported to:

- Barbojo chopping line

The purpose of this chopping line is to adequate the barbojo and obtain from it the best quality. This line involves a strip conductor fed by a loader (diesel tractor with hydraulic lift system) at the beginning of the line, and other strip conductor at the end of the line which carries the load of barbojo processed from the output of the chopper to the wagon to feed boilers or to the yard where the residues are left for its final disposition.

It is worth to drawn attention that at the end of this line, the INCAUCA's laboratory takes samples of the processed barbojo in order to determine the net calorific value.

Then, the barbojo is transported to the boilers feeders by an overturning system (tractor with a wagon with hydraulic turning system).

- Feed boilers system

In this point the total biomass available (bagasse and chopped barbojo) is collected and transported to the boiler by conductors (to transport and feed chopped barbojo, the conductors and boilers feeders were modified by retrofitting).

The Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project reduces GHG emissions by using of residues from the sugar cane harvest (barbojo) as a fuel with the aim to displace the coal use in the boilers at INCAUCA's facility.

The project activity is based on version 01.1 of the methodology AM0036 "Fuel switch from fossil fuels to biomass residues in boilers for heat generation". According to this methodology baseline emissions include CO<sub>2</sub> emissions from fossil fuel combustion in the boilers and CH<sub>4</sub> emissions from the treatment of the barbojo in absence of the project activity; project emissions include CO<sub>2</sub> emissions from on-site fossil fuel combustion by the project, CO<sub>2</sub> emissions from on-site electricity consumption by the project, CO<sub>2</sub> emissions from off-site transportation of barbojo to the project site and CH<sub>4</sub> emissions from combustion of barbojo in the project boiler(s); and no leakage effects are considered

#### 4 DESCRIPTION OF POST REGISTRATION CHANGE

Description of the changes is presented by comparing the registered PDD, with the revised PDD, annexed to the Submission of Request for Approval of Changes.

##### 4.1 Temporary deviations from the registered monitoring plan and/or monitoring methodology

No deviations from the registered monitoring plan and/or methodology were identified during verification

##### 4.2 Corrections

The latest version of the form "Project Design Document" (F-CDM-PDD) has been used by the PP to submit the revised PDD, this form is different from that one used at the registration time, therefore some spaces were filled with complementary information, i.e. *Purpose of data*, required in tables on Sections B.6.2 and B.7.1 of the revised PDD.

For the parameter fixed ex-ante  $EF_{CO_2,FF,I}$ , the PP enhance the description of this variable including the CO<sub>2</sub> emission factor for Diesel besides of the CO<sub>2</sub> emission factor for Coal. This inclusion was made by the PP due to there is Diesel consumption by the transportation of the barbojo to the chopping line and the transportation of the chopped barbojo to the boilers and on the other hand by the transportation of the barbojo from the sugar cane fields to INCAUCA's facility, however it was not established a CO<sub>2</sub> emission factor for Diesel in the registered monitoring plan.

In the applied methodology (AM0036 version 01.1) page 24 states the provisions for this fixed parameter ( $EF_{CO_2,FF,I}$ ), and the correction proposed by the PP in the revised PDD is in accordance with these provisions.

According to the above, ICONTEC confirmed that the corrected information (parameter fixed ex-ante  $EF_{CO_2,FF,I}$ ) accurately reflects the actual project information and also reflects the application of the applied methodology.

On the other hand, the PP corrected the presentation of figures/values/numbers in the revised PDD, since in the registered PDD it was used (in some cases) the comma as decimal separation symbol instead of point.

#### 4.3 Changes to the start date of the crediting period

During this verification exercise, the PP does not wish to change the start date of the crediting period

#### 4.4 Permanent changes from the registered monitoring plan or monitoring methodology

The following are the permanent changes from the registered monitoring plan/monitoring methodology:

- $BF_{k,y}$ : Tons of dry matter (bagasse)  
In the applied methodology (AM0036 version 01.1) page 27 states that the quantity of biomass residue type  $k$  fired in all boiler(s) at the project site during the year  $y$  should be measured by means of onsite measurements, and the registered monitoring plan states the same (see page 36). However the in the onsite visit the PP reported to verification team that it calculated the quantity of bagasse<sup>1</sup> fired in the boilers located at INCAUCA's facility.

The bagasse quantity was determined by using weight and volume meters to measure all variables involved in the biomass (bagasse) determination (also the moisture of the bagasse is taken into account) like flow meters and scales for the sugar cane enter to the mill. ICONTEC deemed that the project participants are unable to implement the monitoring plan contained in the registered PDD and it will not be possible to monitor the registered CDM project activity in accordance with a monitoring plan that would comply with the applied methodology, hence ICONTEC requests guidance from the Board concerning the acceptability of the following estimation method for bagasse quantity:

Equation (1)

<sup>1</sup> The baseline scenario is the heat generation in the absence of the project activity; hence the project scenario is the heat generation due to the biomass residues (the one which is available at the fields – not bagasse) burned in the boiler at the sugar mill facilities', however it is worth to drawn attention that in the boiler is burned not only the biomass available at the field (barbojo) but the bagasse produced internally at the sugar mill.

The biomass residues available at the fields (barbojo) is weighted (the moisture of this biomass residues is taken into account)

Total bagasse production = Cane crushed + Maceration water - Diluted juice.

This equation is based on the amount of sugar cane in accordance with the fundamental equation for factory control Cane Sugar handbook (Chen, James C.P 1991), this method was adopted inside the INCAUCA's quality management system framework<sup>2</sup>.

Equation (2)

Bagasse consumed in boilers = Total bagasse production - Bagasse to Propal - Bagasse to compost + Bagasse in stock

The data used in the equation (1) are measured continuously, as part of the sugar cane mill process, and these data are recorded in software. On daily basis, the quality department at INCAUCA issues a report with the quantities measured for the parameters: cane crushed, maceration water and diluted juice in order to determine the quantity of bagasse produced by the sugar cane mill process.

The bagasse produced by the sugar cane mill process has three uses: a portion of this bagasse is sent to PROPAL<sup>3</sup>, other portion is sent to boilers, other portion is sent to compost and other portion remains in stock. The bagasse sent to PROPAL and the bagasse sent to compost is weighted in a Truck scale (labeled by INCAUCA as) N° 6 and these data is recorded at SIAGRI<sup>4</sup>.

With the aim to calculate the bagasse used in boilers, it is necessary to take the value obtained in equation (1) and take from it the values measured for bagasse sent to PROPAL, the bagasse sent to compost, and the bagasse remains in stock.

The following equipments are used to perform the measurements:

- To calculated total bagasse production (equation (1)):
  - Cane Crushed:  
Truck scale (labeled by INCAUCA as) N° 1  
Manufacturer: Mettler Toledo  
Accuracy:  $\pm 30$  kg
  - Maceration Water:  
  
Flow meter (for the Fulton mill)  
Manufacturer: Foxboro  
Accuracy:  $\pm 0.0015$  m/s

<sup>2</sup> Procedure V-950-001, version 3, dated on January 2013 issued by INCAUCA S.A. Title: Monitoring of barbojo used at the boilers

<sup>3</sup> This bagasse is used as a raw material in the manufacture of paper, and PROPAL delivers to INCAUCA its calorific value equivalent in coal, this coal is used in INCAUCA's boilers as a fuel. More information regarding PROPAL in: <http://www.propal.com.co/index.php?lang=en>

<sup>4</sup> SIAGRI is a software used by INCAUCA for the agricultural management of its operations including field work, harvest and weighing products

Flow meter (for the Farrel mill)  
Manufacturer: Foxboro  
Accuracy:  $\pm 0.0015$  m/s

- Diluted Juice

Flow meter (for the Fulton mill)  
Manufacturer: Foxboro  
Accuracy: Class III

Flow meter (for the Farrel mill)  
Manufacturer: Foxboro  
Accuracy: Class III

- To calculate the bagasse used in boilers (equation (2)) for bagasse sent to PROPAL and bagasse sent to compost

Truck scale (labeled by INCAUCA as) N° 6.  
Manufacturer: Mettler Toledo  
Accuracy:  $\pm 30$  kg

It is worth to draw attention that this estimation for bagasse used in boilers is a recognized monitoring method for sugar industries<sup>5</sup>, and this estimation method was also used by INCAUCA in the development of the audit for cogeneration plants undertaken by the CREG<sup>6</sup> and it was approved by this Colombian entity.

- $EC_{PJ,y}$ : On-site electricity consumption attributable to the project activity during the year  $y$ .  
In the applied methodology (AM0036 version 01.1) page 28 states that the On-site electricity consumption attributable to the project activity during the year  $y$  should be measured by means of on-site measurements, and QA/QC procedures is based on Cross-check measurement results with invoices for purchased electricity if available; the registered monitoring plan states the same (see page 38). However in the onsite visit the audit team found that is not always possible, since the electricity consumption is generated by INCAUCA itself, therefore, sometimes there is no invoice for purchased electricity and the cross-checking is not always possible.

<sup>5</sup> Bagasse based Cogeneration Project - Satish Sugar Limited, see PDD available at [http://cdm.unfccc.int/filestorage/S/G/Y/SGYT8NFVMD6PR4C1AEXOKZBHW2J75/4057%20PDD\\_rev.pdf?t=cDR8bXVzNndpfDC1TA83hMgIDtSDne9NV68E](http://cdm.unfccc.int/filestorage/S/G/Y/SGYT8NFVMD6PR4C1AEXOKZBHW2J75/4057%20PDD_rev.pdf?t=cDR8bXVzNndpfDC1TA83hMgIDtSDne9NV68E) pages 42 and 43

Ecoelectric-Valdez bagasse cogeneration plant, see PDD available at [http://cdm.unfccc.int/filestorage/G/T/Q/GTQ6CI3XO1E5UZ497WMKPVDBJ2YSLF/Clean%20version%20-%20PDD%20Version9%20-%20July%2013%2C%202011%20-%20Ecoelectric%20Valdez%20Bagasse%20Cogeneration%20Plant.pdf?t=Vkv8bXVzNzNyfDDJL7dlpOe-yZ\\_wAaRhN4\\_p](http://cdm.unfccc.int/filestorage/G/T/Q/GTQ6CI3XO1E5UZ497WMKPVDBJ2YSLF/Clean%20version%20-%20PDD%20Version9%20-%20July%2013%2C%202011%20-%20Ecoelectric%20Valdez%20Bagasse%20Cogeneration%20Plant.pdf?t=Vkv8bXVzNzNyfDDJL7dlpOe-yZ_wAaRhN4_p) pages 54 and 55

<sup>6</sup> Colombian Regulatory Commission for electricity and gas  
[http://www.creg.gov.co/html/i\\_portals/index\\_ingles.php](http://www.creg.gov.co/html/i_portals/index_ingles.php)

That is why; the PP has decided to reinforce the QA/QC procedures established in the registered monitoring plan describing the calibration activities to carry out for the electricity meter which measures the on-site electricity consumption attributable to the project activity during the year  $y$ . The PP has added in the revised PDD the following sentence: *Power meters will be calibrated periodically according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer's specifications (at least once every three years).*

ICONTEC verified the Measurement Code<sup>7</sup> issued by CREG<sup>6</sup> and reviewed that the PP proposal for the QA/QC for the electricity meter which measures the on-site electricity consumption attributable to the project activity during the year  $y$  is in accordance with the Colombian Regulation.

This permanent change is not led to a reduction in the accuracy of the calculation of emission reductions.

- $EF_{grid,y}$ : CO<sub>2</sub> emission factor for electricity used from the grid.  
In the applied methodology (AM0036 version 01.1) page 28 states that the monitoring frequency for CO<sub>2</sub> emission factor for electricity used from the grid should be either once at the start of the project activity or updated annually, consistent with guidance in ACM0002; the registered monitoring plan states the same (see page 39).

The PP has decided to precise that the CO<sub>2</sub> emission factor for electricity used from the grid will be calculated once at the start of the project activity. ICONTEC deemed this decision in accordance with the applied methodology.

This permanent change is not led to a reduction in the accuracy of the calculation of emission reductions.

- $NCV_i$ : Net calorific value of fossil fuel, coal, type  $i$ .

In the registered monitoring plan it was established that the QA/QC procedures for this monitored parameter would be to check consistency of measurements with CENICAÑA<sup>8</sup> determinations. In the revised PDD the PP correct this statement and established to check consistency of measurements with IPCC determinations.

ICONTEC understood this correction as an editorial modification, since CENICAÑA<sup>8</sup> is a Colombian entity which does not carry out this type of measurements. On the other hand the correction proposed by the PP in the registered monitoring plan is in accordance with the applied methodology (AM0036 version 01.1) page 30.

<sup>7</sup> Available at <http://apolo.creg.gov.co/Publicac.nsf/Indice01/Codigos-1995-RES.025-1995.COD..REDES-.COD.MEDIDA?OpenDocument>

<sup>8</sup> Colombian Sugarcane Research Center, information available at [http://www.cenicana.org/quienes\\_somos/index\\_eng.php](http://www.cenicana.org/quienes_somos/index_eng.php)



This permanent change is not led to a reduction in the accuracy of the calculation of emission reductions.

- $FC_{on-site,i,y}$ : Quantity of fossil fuel type  $i$  combusted at the project site for other purposes than heat generation as a result of project activity during the year  $y$ , and
- $NCV_i$ : Net calorific value of fossil fuel, diesel, type  $i$ .

In the onsite visit the audit team noticed that there are not monitored parameters related with the Diesel consumption at the project site for other purposes than heat generation as a result of project activity, in order to response this finding from the audit team, the PP included the parameters  $FC_{on-site,i,y}$  and  $NCV_i$  in the revised PDD and the provision described for these monitored parameter are in accordance with the applied methodology (AM0036 version 01.1) pages 27-28 and 29-30 respectively.

These permanent changes are not led to a reduction in the accuracy of the calculation of emission reductions.

#### 4.5 Changes to the project design of a registered project activity

There were not proposed or actual changes to the project design of a registered CDM project activity.

##### 4.5.1 Dates of changes

N.A

##### 4.5.2 Reasons for changes taking place

N.A

##### 4.5.3 Knowledge of changes prior to registration of the project activity

##### 4.5.4 Impact of changes

N.A

##### 4.5.4.1 Additionality of the project activity

N.A

##### 4.5.4.2 Scale of the project activity

N.A

**4.5.4.3 Applicability and application of approved baseline methodology under which the project activity has been registered or the later version of the applied methodology**

N.A

**4.5.4.4 The compliance of the monitoring plan with applied monitoring methodology**

N.A

**4.5.4.5 The level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan**

N.A

## 5 CONCLUSION OF VALIDATION ASSESSMENT

ICONTEC can confirm that the changes on PDD, Version 17, dated on October 9<sup>th</sup>, 2013, described on the Section 4 of this document, which corresponds to:

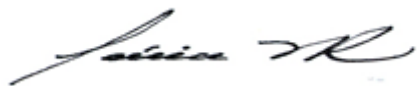
- Correction in the parameter fixed ex-ante  $EF_{CO_2,FF,I}$
- Change in the monitored parameter  $BF_{k,y}$ : Tons of dry matter (bagasse)
- Change in the monitored parameter  $EC_{PJ,y}$ : On-site electricity consumption attributable to the project activity during the year  $y$ .
- Change in the monitored parameter  $EF_{grid,y}$ : CO<sub>2</sub> emission factor for electricity used from the grid.
- Change in the monitored parameter  $NCV_i$ : Net calorific value of fossil fuel, coal, type  $i$ .
- Inclusion of the monitored parameters  $FC_{on-site,i,y}$ : Quantity of fossil fuel type  $i$  combusted at the project site for other purposes than heat generation as a result of project activity during the year  $y$ , and  $NCV_i$ : Net calorific value of fossil fuel, diesel, type  $i$ .

Summary, Project activity description:

CDM project:	Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project
Reg. number:	1770
Register Date:	16/10/2008
PDD date and Version:	27/03/2008, version 16
PDD revised:	09/10/2013, version 17

This validation opinion follows guidance and complies with the requirements of the VVS.

Bogotá D.C., 23/10/2013



Monica Vivas

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ICONTEC