Validation report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the validation report form for CDM project activities" at the end of this form.

VALIDATION REPORT	
Title of the project activity	Sogamoso Hydroelectric Project
Version number of the validation report	1.5*Aa
Completion date of the validation report	15/06/2016
Version number of PDD to which this report applies	Version 8 of 10/06/2015
Date when PDD was uploaded for global stakeholder consultation	21/06/2010
Project participant(s)	ISAGEN S.A. E.S.P. PricewaterhouseCoopers Asesores Gerenciales Ltda.
Host Party	Colombia
Estimated annual average GHG emission reductions or net removals in the crediting period (tCO2e)	1,386,355 annual average
Sectoral scope(s) and selected methodology(ies)	Sectoral Scope: 1 - Energy industries (renewable - / non-renewable sources). ACM0002 – "Grid-connected electricity generation from renewable sources" version 16.0 of 28/11/2014
Name of DOE	RINA Services S.p.A. (RINA)
Name, position and signature of the approver of the validation report	Laura Severino – Sector Manager Sustainability, Environment & Climate Change 

*The validation report major number is unchanged and the minor number is increased for the following reason:
(i) 1.5 the version was updated due to UNFCCC incomplete asking for the submission of the validation report using the valid version of the applicable validation report form for registration of CDM project activities.

SECTION A. Executive summary

Purpose and general description of the project activity.

The purpose of the Project is to utilize the hydrological resources of the Sogamoso River through the construction of a dam to generate low emissions electricity for the Grid. The maximum total installed capacity of the Project, based on the generators' nameplate, will be 874.8 MW comprised of three Francis turbines /21/. The estimated average electricity production supplied to the Colombian National Interconnected System (also referred to as "the National Grid" or simply "the Grid") will be 5,056 GWh per year. This value is indicated in the document 'Update of designs of tender and Environmental Impact Study for Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, revision 1 - June 9, 2008', prepared by INGETEC S.A. as an independent consultant of the Project /21/. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity.

Scope of the validation process.

The validation process is conduct an independent assessment of the proposed CDM project activity against the applicable CDM rules and requirements.

The scope of validation process is:

(a) Determine whether the proposed CDM project activity comply with the requirement of paragraph 37 of the CDM M&Ps, the applicability conditions of the selected methodology, and guidance by the Board;

(b) Assess the claims and assumptions of the PDD.

Validation process.

Validation was conducted for assessing the information provided by the project participants using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review involving a review of data and information; cross checks between information provided in the PDD and information from sources other than those used.
- Follow-up actions including on-site inspection and interviews with relevant stakeholders and cross checks between information provided by interviewed personnel to ensure that no relevant information has been omitted ;
- The resolution of outstanding issues and the issuance of the final validation report.

Validation is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

Conclusion.

RINA Services S.p.A. (RINA), commissioned by PricewaterhouseCoopers Asesores Gerenciales Ltda, has performed the validation of the project activity Sogamoso Hydroelectric Project in Colombia, with regard to the relevant requirements for CDM activities.

In conclusion, it is RINA's opinion that the project activity Sogamoso Hydroelectric Project, in Colombia, as described in the PDD Version 8 of 10/06/2015

, meets all relevant requirements for CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002 – "Grid-connected electricity generation from renewable sources" Version 16.0 of 28/11/2014

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader, Validator, Technical expert TA 1.2 (until 01/09/2012)	IR	San Valero	Vicente	RINA Brazil	x	x	x	x
2.	Team Leader, Validator, Technical expert TA 1.2	IR	Principe Branco Saettoni	Geisa Maria	RINA Brazil	X			
3.	CDM Validator	IR	de Lima Carvalho	Thais	RINA Brazil	x	x	x	x
4.	CDM Validator	IR	Miranda Dias	Citia Mara	RINA Brazil	x	x	x	x
5.	Financial Expert	EI	Mendonça de Oliveira	Tiago	RINA Brazil				x
6.	Financial Expert	IR	Junior Varkulya	Américo	RINA Brazil				x

B.2. Technical reviewer and approver of the validation report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Valoroso	Rita	RINA Central Office
2.	Approver	IR	Severino	Laura	RINA Central Office

SECTION C. Means of validation

C.1. Desk review

The PDD, Version 8 of 10/06/2015

and previous versions /01/, in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date of the project, the monitoring plan, the emission reduction calculations provided in the form of a spreadsheet, Sogamoso Hydroelectric Project and previous versions/19/, were assessed as part of the validation. All documents reviewed or referenced during the validation are listed in Appendix 3.

C.2. On-site inspection

Duration of on-site inspection: 24/08/2010 to 26/08/2010				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Approval, authorization and contribution to sustainable development. Project activity design and implementation. Assessment of choice and applicability of the baseline methodology, project boundary and emissions sources included in the project boundary. Additionality. Ex-ante parameters, baseline, project and leakage emissions calculation. Monitoring Plan. Environmental impacts.	Isagen office, PWC office	24/08/2010 and 25/08/2010	Vicente San Valero Thais de Lima Carvalho
2	Interviewing project proponent on operation and maintenance. Local stakeholders and consultation.	Sogamoso Hydro Power plant, located in the municipalities of Girón, Betulia, Zapatoca, Los Santos and San Vicente de Chucurí, in the Department of Santander, Colombia	26/08/2010	Vicente San Valero Thais de Lima Carvalho

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Salas Pajon	Sergio	PWC	24/08/2010 to 26/08/2010	Project design and implementation, Financial analysis, barrier analysis, common practice analysis, ER spreadsheets, emission factor calculation, monitoring of the project activity, Local legislation, environmental licenses, Local stakeholders' consultation	Vicente San Valero
2.	Gomez	Camilo	PWC	24/08/2010 to 26/08/2010		Thais de Lima Carvalho
3.	Murcia	Marco	PWC	24/08/2010 to 26/08/2010		Vicente San Valero
4.	Cortes	Andrea	PWC	24/08/2010 to 26/08/2010		Thais de Lima Carvalho
5.	Fherman Espinosa	Adolfo	Isagen	24/08/2010 to 26/08/2010		Vicente San Valero
6.	P.G.	Maria Andrea	Isagen	24/08/2010 to 26/08/2010		Thais de Lima Carvalho
7.	Bustamante	Alberto	Isagen	24/08/2010 to 26/08/2010		Vicente San Valero
8.	Gomez	Ana Maria	Isagen	24/08/2010 to 26/08/2010		Thais de Lima Carvalho
9.	Posada	Luis Alberto	Isagen	24/08/2010 to 26/08/2010		Vicente San Valero
10.	Benítez Rodríguez	Jorge Ernesto	Isagen	24/08/2010 to 26/08/2010		Thais de Lima Carvalho
11	Tercero	Juan	Ciniega El Llanito Fishermans community (Barrancabermeja municipality)	24/08/2010 to 26/08/2010	Comments about project's area of influence, impacts, relation with PPs	Vicente San Valero
12	Joia Caballero	Antonio	Casa de Barro community (Betulia municipality)	24/08/2010 to 26/08/2010	Comments about project's area of influence, impacts, relation with PPs	Thais de Lima Carvalho
13	Esperanza	Gil	Plazuela community (Zapatoca municipality)	24/08/2010 to 26/08/2010	Comments about project's area of influence, impacts, relation with PPs	Vicente San Valero
14	Ardilla	Leonardo	CEN - UNAB	24/08/2010 to 26/08/2010	Employment program	Thais de Lima Carvalho

C.4. Sampling approach

>>N/A

C.5. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Global stakeholder consultation	-	-	-
Approval	-	1	-
Authorization	-	-	-
Contribution to sustainable development	-		-
Modalities of communication	-	-	-
Project design document			-
Description of project activity	1	2	-
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline		1	-
- Deviation from methodology	-	-	-
- Clarification on applicability of methodology, tool and/or standardized baseline	-	-	-
- Project boundary		1	-
- Establishment and description of baseline scenario	1		-
- Demonstration of additionality	11	7	-
- Emission reductions	2		
- Monitoring plan		4	
Duration and crediting period		1	-
Environmental impacts	2		-
Local stakeholder consultation	1		-
Others (please specify)			-
Total	18	17	

SECTION D. Validation findings

D.1. Global stakeholder consultation

Means of validation	The PDD version 1 of 21/06/2010 was made publicly available on the CDM UNFCCC website (http://cdm.unfccc.int/Projects/Validation/DB/IE9YQR3R4CY458164L56XPG920SQ1N/view.html) and Parties, stakeholders and NGOs were invited to provide comments during a 30 days period from 25/06/2010 to 24/07/2010.
Findings	N/A
Conclusion	No comments were received during the Global stakeholder consultation. It is RINA's opinion that the changes in the PDD during the validation process does not require the publication of the revised PDD for global stakeholder consultation.

D.2. Approval

Means of validation	The project's host Party is Colombia. The project participant are PricewaterhouseCoopers Asesores Gerenciales Ltda and ISAGEN S.A. E.S.P. from Colombia, both private entities; the project is a unilateral project and hence the host country is the only Party involved in the proposed project activity. Colombia fulfils the requirements to participate in the CDM, having ratified the Kyoto 30/11/2001and established as DNA the "Ministerio de Ambiente, Vivienda y Desarrollo Territorial", as per the UNFCCC website /33/. The project participant is correctly listed in table A.4 of the PDD and the information is consistent with the contact details provided in Apendix 1 of the PDD /1/. The DNA of Colombia issued a Letter of Approval on 02/10/2013 , authorizing ISAGEN S.A. E.S.P and PricewaterhouseCoopers Asesores Gerenciales Ltda. as project participants and confirming that the project assists in achieving sustainable development,the CDM project activity contributes to the sustainable development of

	the Host Country and clear states on the ratification of Kyoto Protocol and voluntary participation /48/. The Letter of Approval was received from the PP and refers to the precise project proposed project activity in the PDD submitted for registration /1/. The authenticity of the letters of approval has been validated by verifying the e-mail received from PP. The letter have been issued by the respective DNA of Colombia and RINA has not found reason to doubt their authenticity. By checking the above documents /1/ /48/ RINA considers the LoA in accordance with paragraphs 40-43 - 49 of the CDM-VVS /3/. The proposed project does not involve any public funding from an Annex I Party, and the validation did not reveal any information that indicated that the project could be seen as a diversion of official development assistance (ODA) funding towards the host country.It has been confirmed in the financial model /19//20/ that there is no public funding committed in the proposed project activity.
Findings	CAR 3: Project participants shall provide the project's LoA, with the written approval of voluntary participation from the DNA of Colombia, including the confirmation that the Project assists the country in achieving sustainable development.
Conclusion	The DNA of Columbia issued a Letter of Approval on 02/10/2013. The Letter of Approval was received from PricewaterhouseCoopers Asesores Gerenciales Ltda and and refers to the precise project proposed project activity in the PDD submitted for registration /1/l

D.3. Authorization

Means of validation	The project participant is correctly listed in table A.4 of the PDD and the information is consistent with the contact details provided in Appendix 1 of the PDD /01/ and no other entities than those authorizes as PP are included in the above sections of the PDD.

Project participants	ISAGEN S.A. E.S.P and PricewaterhouseCoopers Asesores Gerenciales Ltda.	N.A
Parties involved	Host Country: Colombia	Annex I Country: N.A
APPROVAL		
LoA received	Yes /48/	N.A
Date of LoA	02/10/2013	N.A
LoA received from	PP	N.A
Validation of authenticity	E-mail from Colombian DNA to ISAGEN /49/	N.A
Validity of LoA	Yes	N.A
PARTICIPATION		
Party is party to Kyoto Protocol	Yes	N.A
Voluntary participation	Yes	N.A
Project contribution to SD	Yes	N/A

Findings	CAR 3: Project participants shall provide the project's LoA, with the written approval of voluntary participation from the DNA of Colombia, including the confirmation that the Project assists the country in achieving sustainable development

Conclusion	RINA confirmed that the DNA of Colombia issued the letter of Approval on 02/10/2013 authorizing ISAGEN S.A. E.S.P and PricewaterhouseCoopers Asesores Gerenciales Ltda as project participant .

D.4. Contribution to sustainable development

Means of validation	It is described in the PDD that the project will contribute to the region's sustainable development in the following ways: the Project launches various investment programs and employment opportunities contributing to the socio-economic development of the nearby municipalities and the Department. Through the "Community Information and Participation Program" the Project contributes to the formation of the participative and self-advocating communities. ISAGEN follows the criteria and guidelines established by the "World Commission on Dams" about policies and corporate expressions of social responsibility. Protection of natural environment as the basin of Sogamoso river and the restoration, conservation and protection of the Natural National Park Serrania de Los Yariguies , among other programs. The contribution of Sogamoso Hydroelectric Project to the sustainable development was confirmed by Colombian DNA, as per description of LoA /48/.
Findings	N/A
Conclusion	RINA confirmed that the DNA of Brazil issued a Letter of Approval on 02/10/2013, confirming that the project assists in achieving sustainable development and the CDM project activity contributes to the sustainable development of the Host Country /70/. /3/.

D.5. Modalities of communication

Means of validation	The MoC 28/05/2015 /57/ was provided by PricewaterhouseCoopers Asesores Gerenciales Ltda. with whom RINA has a contractual relationship confirmed by the request of services signed on 06/05/2010 /56/. The corporate identity of all PPs and focal points included in the MoC statement, as well the personal identities, the signatures and the related authorized signatures, and the employment status have been cross-checked through notarised letters from Isagen S.A. E.S.P. and PricewaterhouseCoopers Asesores Gerenciales Ltda. legal representatives confirming authorized signatories in MoC /57//59/ and through certificates of existence and representation issued by Comercial Chambers /58//60/ whose powers are designated by the Colombian Comercial Code /61/.
Findings	N/A
Conclusion	RINA confirms that the MoC statement provided by the PP(s) /57/ is based on the currently valid form "Modalities of Communication Statement" (F-CDM-MOC) /40/, the information required by the form including its Annex 1 is correctly completed, and the PP(s) authorized signatories signing the MoC correspond to the PP(s) authorized signatories included in Annex 1. In conclusion, RINA confirms that the MoC statement provided by the PP(s) is in accordance with the requirements in para 61-68 as well it is in accordance with the requirements in para 66 of the CDM-VVS /3/.

D.6. Project design document

Means of validation	The PDD for the project activity Sogamoso Hydroelectric Project in Colombia, /1/ submitted by PricewaterhouseCoopers Asesores Gerenciales Ltda and ISAGEN S.A. E.S.P. have been the basis for the validation process. The main changes between the PDD version 01 of 21/07/2010 published for GSC and the PDD version 08 of 10/06/2015 submitted for registration are the following:

Section of the PDD	Description and reason for changing the information

		in that section
	All PDD	Updated to VVS
	PDD version 02	Change on installed capacity; the barriers analysis was removed, revision of financial analysis
	PDD version 08	The recommendations described by Colombian DNA were included in PDD
Findings	N/A	
Conclusion	RINA confirms that the above PDD was completed using the valid version of the PDD form and instructions therein, and the form appropriated to the type of the proposed CDM project activity as per the para 69-70 of VVS /3/	

D.7. Description of project activity

Means of validation	The purpose of the Project is to utilize the hydrological resources of the Sogamoso River through the construction of a dam to generate low emissions electricity for the Grid. The maximum total installed capacity of the Project, based on the generators' nameplate, will be 874.8 MW comprised of three Francis turbines /21/. The estimated average electricity production supplied to the Colombian National Interconnected System (also referred to as "the National Grid" or simply "the Grid") will be 5,056 GWh per year. This value is indicated in the document 'Update of designs of tender and Environmental Impact Study for Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, revision 1 - June 9, 2008', prepared by INGETEC S.A. as an independent consultant of the Project/21/. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity. **Project location** The project activity is located in the Republic of Colombia, Department of Santander. The dam and the reservoir are located in the jurisdiction of the municipalities of Girón, Betulia, Zapatoca, Los Santos and San Vicente de Chucurí, in the Department of Santander. Geographical coordinates are: 7° 6' 0.427" N and 73° 24' 26.623" W (confirmed in the Google Earth) /47/. **Scenario existing prior to the implementation of the project activity** The hydropower plant is a Greenfield power plants (new installations), confirmed through the environmental licenses/EIA /16/ /17/ and site visit. Before the implementation of the project activity no power plant is installed at the project site; the energy that would be generated by the project currently is dispatched by other power plants that are connected to the national grid, and that include fossil fuel power plants. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity **Technology(ies) employed** The main equipments that PP has decided to install at Sogamoso project are described in the Ingetec S.A., Update of designs of tender /21/.The project design engineering reflects current good practices. INGETEC (contracted constructor) is a very well-known company with extensive experience in, to give some examples, design, consultancy and supervision of hydroelectric and thermoelectric projects, transmission lines and substations and main equipments suppliers will be international companies described in the PDD, transferring technology from Annex I country to Sogamoso project. The specifications of the main electro-mechanic equipments are (3 sets): **Hydraulic Turbine** Francis type, vertical axis, continuous operation Speed: 163.63 rpm Rated flow: 210 m^3/s Rated Net Head: 145.53 m Rated Power: 278.8 MW **Electric Generator**

	Synchronous type, three-phase, vertical axis Frequency: 60 Hz Air-cooling Power: 324 MVA Power factor: 0.9 Voltage: 16.5 kV During the site visit, the project was being implemented, however, the equipments were not installed. **Project implementation** The starting date of the project activity is 27/07/2009 and represents the signature of the the contract for the main services work (deviation tunnels, access tunnels and caverns to install turbines, generators, etc) between ISAGEN S.A. E.S.P. and Grupo ICT S.A.S (nº 46/3147) /11/. Rina also verified the document ISAGEN Service Order /12/ (from Spanish "Orden de Inicio de las actividades del Contrato") that is part of the contract /11/. This service order was signed on 03/08/2009 (after the Contract Insurance policy was confirmed) and establishes that the contract activities are to start on 05/08/2009 (the contractual period starts on 05/08/2009). By the evidences checked RINA confirms that the project start date was correctly defined in accordance with Glossary of CDM Terms /8/, since it is earliest date at which either the implementation or construction or real action of a CDM project activity begins. At the time of the site visit the project was being implemented. The expected operational lifetime of the project activity is 50 years (main civil works and infrastructure – 50 years and generation equipment – 25 years, which is more than the expected 21 years crediting period) and this has been confirmed through the article from National Society of Mining, Oil and Energy /14/ and by a paper from the Münchener Rück - Munich Re Group entitled "*Tecnología para underwriter - 38 Centrales hidroeléctricas.pdf*" (2009) /15/which mentions a lifetime of 50 years for hydro plants. Furthermore, project participants provided a survey of hydroelectric plants operating in Colombia (data from CND -XM) /35/ which shows that 6 plants are operating for more than 40 years. Nevertheless, in case the lifetime of some of the equipment happen to be shorter than the duration of the CDM project activity, project participants will ensure their replacement (if necessary) with equipment of equal or similar technical and operational specifications, therefore the characteristics considered for the CDM project will remain the same.
Findings	CAR 1: It is requested to PP to revise the installed capacity of the project activity as per the definitions of the applied methodology ACM0002: "The installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units". CAR 2: The updated EIA, revision 1, dated December 2008 /16/, describes that the reservoir of the Sogamoso project will have a maximum volume of 4,800,000,000 m3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of the reservoir. It is requested to PP to revise the reservoir area presented in the PDD version 1 of 6,960 ha. It is also requested to PP to revise the power density of the project activity. CL18: PP is requested to clearly address in the PDD if the technology to be used will result in a significantly better performance than any commonly used technologies in the host Country and if there is any transfer of technology from any Annex I Party involved. To close out CAR 1 The installed capacity was revised in the PDD version 2 and is in accordance with the equipments specification and ACM0002 definitions. The

	installed capacity described in the PDD version 2 is 874.8 MW. Moreover the energy generation of 5,056 GWh is based on the study provided by Ingetec S.A. To close out CAR 2: The reservoir area and power density were revised accordingly in the PDD version 2. To close CL 18: PDD version 2 was revised to include the description Technology Transfer that will be provided in the project activity. Equipments will be provided by specialized companies from Annex 1 countries
Conclusion	. RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate. RINA confirms that the description of the proposed CDM project activity, as contained in the PDD sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.

D.8. Application of selected baseline and monitoring methodology and selected standardized baseline

D.8.1. Applicability of methodology and standardized baseline

Means of validation	The project correctly applies the approved baseline and monitoring methodology ACM0002 “Grid-connected electricity generation from renewable sources”, version 16.0 of 28/11/2014 /2/. The proposed project activity meets the criteria defined in the baseline methodology as described below: This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s). Confirmed in the applicable licenses/EIA /16/ /17/ and site inspection that the project activity corresponds to the installation of a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant). The methodology is applicable under the following conditions: The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; Confirmed in the applicable licenses /16/ /17/ and site visit, that the project activity consists of the installation of a new hydro power plant. As per ACM 0002, the project consists of a hydro power plant and complies with the following conditions: Option C: the project activity results in new single or multiple reservoirs and the power density , calculated using equation (3) of ACM0002 v16, is greater than 4 W/m2. RINA has been confirmed this condition on-site inspection and review documents /16//17/.The updated EIA, revision 1, dated December 2008 /16/, describes that the construction of the dam will result in a reservoir for the Sogamoso project which will have a maximum volume

	of 4,800,000,000 m3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of a reservoir. The installed capacity is confirmed in the project design /21/. The power density of the project is 11.53 W/m^2, greater than 4 W/m^2. Therefore, option 3 above applies to the project activity. The methodology is not applicable to the following: Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; The project activity does not involve switching from fossil fuel to renewable energy. It corresponds to a Greenfield project /16/ /17/. Biomass fired power plants: the project activity does not correspond to a biomass power plant. It is a hydropower plant. In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance. This condition is not applicable. It corresponds to a Greenfield project /16/ /17/. The project activity applies the following methodological tools: "Tool to calculate the emission factor for an electricity system" version 04.0 of 04/10/2013 /7/. This tool is used to calculate the grid emission factor. As described in the tool, it may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). Confirmed in the environmental licenses /16/that the project activity will supply electricity to the National grid (SIN), confirming the applicability of the tool. Tool for the demonstration and assessment of additionality version 07.0.0 of 23/11/2012 /6/that is applied to assess the additionality of the project activity states that: "Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.
Findings	CAR 14: The project applies the ACM 0002 version 11 which is no longer valid. Therefore, PP is requested to update the PDD to the latest valid ACM0002 version 12.1.0, /2/ and, if applicable, to also revise calculations. To close out CAR 14: Project participants updated the PDD version 2 according to baseline and monitoring methodology ACM002 – Grid-connected electricity generation from renewable sources, version 16.0 of 28/11/2014..
Conclusion	RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein and the selected version is valid at the time of submission of the proposed project activity for registration. It is also confirmed that the methodology is correctly applied by comparing it with the actual text of the applicable version of the methodology.

D.8.2. Deviation from methodology

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.8.3. Clarification on applicability of methodology, tool and/or standardized baseline

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.8.4. Project boundary

Means of validation

According to the approved baseline and monitoring methodology "ACM0002, "Grid-connected electricity generation from renewable sources", version 16.0 of 28/11/2014 /2/ the project boundary includes the Colombian National Interconnected System (SIN) and the physical and geographical site where the electric generation plant, dam and reservoir are located.

Emissions sources included in the project boundary are shown in the table below:

	GHGs involved	Description
Baseline emissions	CO_2	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.
Project emissions	N/A	According to ACM0002 version 16.0, no project emissions have to be included for hydro power plants with Power density greater than 10 W/m^2. The power density of the project is 11.53 W/m^2, greater than 4 W/m^2. The updated EIA, revision 1, dated December 2008 /16/, describes that the reservoir of the Sogamoso project will have a maximum volume of 4,800,000,000 m^3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of the reservoir. The installed capacity is confirmed in the project design /21/
Leakage	N/A	According to ACM0002 version 16.0, no leakage has to be considered for the project activity The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected.

Emission sources which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reduction have not been identified /2/.

Findings

CAR 4: PP is requested to include in the diagram presented in the section B.3 of the PDD version 1 the substation meters that measure the net energy delivered to the grid. To close out CAR 04: The diagram presented in the section B.3 includes the energy meters that measures the net energy delivered to the grid.

	The diagram also includes the reservoir, project equipments and the Colombian National interconnected grid.
Conclusion	By checking the information and evidences available /17/ /18/ and by the physical site, RINA can confirm that all the emission sources and gases have been included in the project boundary and the description in the PDD is accurate and complete, and also that the selected sources and gases are justified for the proposed project activity.

D.8.5. Establishment and description of baseline scenario

Means of validation	According to the approved baseline methodology ACM0002 /2/ if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" /07/. The emission factor data used in the project activity is based on data provided by the Colombia government /42/, using the most recent data available at the time of PDD publication from 2008. The building margin and the operating margin will be monitored ex-post.
Findings	CL 2: As per the applied methodology (ACM0002), as the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is already defined and therefore there is no need to identify alternative scenarios. PP is requested to revise PDD accordingly. To close out CL 2: The baseline presented in the PDD version 2 is according to the one defined in the ACM0003, version 12.1.0: *Delivered electricity to the grid by the project activity that would have otherwise been generated by the operation of power plants connected to the grid and the additions of new power plants, as reflected in the calculation of the combined margin in the "Tool to calculate the emission factor for an electricity system".*
Conclusion	RINA was able to verify the documented evidence listed above during the validation process and can confirms that the approved baseline methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 16.0 of 28/11/2014 /2/, has been correctly applied and the confirmed baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

D.8.6. Demonstration of additionality

Means of validation	According to the approved baseline and monitoring methodology ACM 0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 16.0 of 28/11/2014 /2/, the additionality of the project has been established applying the Tool for the demonstration and assessment of additionality, version 0.7.0.0, dated 23/11/2012 /6/ The above opinion of RINA to the additionality of the proposed project is further explicitly explained in the following steps. **Project starting date**. The starting date of the project activity is 27/07/2009 and represents the signature of the contract for the main services work (deviation tunnels, access tunnels and caverns to install turbines, generators, etc) between ISAGEN S.A. E.S.P. and Grupo ICT S.A.S (nº 46/3147) /11/. Rina also verified the document ISAGEN Service Order /12/ (from Spanish "Orden de Inicio de las actividades del Contrato") that is part of the contract /11/. This service order was signed on 03/08/2009 (after the Contract Insurance policy was confirmed) and establishes that the contract activities are to start on 05/08/2009 (the contractual period starts on 05/08/2009). By the evidences checked RINA confirms that the project start date was correctly defined in accordance with Glossary of CDM Terms /8/, since it is earliest date at which either the implementation or construction or real action of a CDM project activity begins. At the time of the site visit the project was being implemented

Prior consideration of CDM.

As the project activity is a new project activity (starting date on or after 02 August 2008, for which PDD has not been published for GSC before project start date) the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status.

It was verified in the UNFCCC web site that such notification was received on 16/10/2009 /34/.

RINA also verified the below evidences /25/related to the Host Party DNA notification:

- Outlook delivery receipt of the email sent to Colombia DNA, dated 02/10/2009
- Isagen letter number 17172749 sent to the Colombia DNA with the template provided in the EB 48, annex 62 fulfilled, dated 01/10/2009;

All notifications were provided within six months of the project activity start date. Therefore, the CDM prior consideration by project participant is correctly demonstrated, as per paragraph 115 of the VVS /5/.

Identification of alternatives.

According to the approved baseline methodology ACM0002 /2/the baseline scenario is "Electricity delivered to the Grid by the project activity that would have otherwise been generated by the operation of Grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". Since the baseline scenario prescribed in the approved methodology no further analysis is required as per paragraph 124 of the CDM-VVS /3/. The project proponent has justified the selection of the baseline scenario in line with the applied methodology and the same is deemed reasonable.

Investment analysis.

Choice of approach. Project participants applied the Option III Benchmark Analysis, in line with "tool for the demonstration and assessment of additionality" sub step 2b "Option III apply /6/. The simple cost analysis is not applicable because the project will generate financial and economic benefits (from electricity sales) other than CDM related income. The investment comparison analysis is not applicable either because the only alternative to the project activity is the supply of electricity from a grid, which is not to be considered a similar investment project. The financial/economic indicator used by the project participants is the IRR, which was confronted, as presented on published PDD /01/ with cost of equity of electricity sector. The spreadsheet with investment analysis provided by the project participants, "ISAGEN - Financial Model of the Sogamoso Project - Adjusted Buget - Marzo 6 de 2015.xls" /19/and cost of equity (ke) "*Benchmark calculation .xlsx*" /27/ indicates that the IRR obtained is equal to 12.97% while the value of cost of equity (ke) (Benchmark) is 14.50%.

Benchmark selection. The source of the formula is the Capital Asset Pricing Model (CAPM), one of the most widely accepted models used to determine the required rate of return on equity. CAPM consists into a government bond rate increased by a suitable risk premium and calculates a newly introduced asset's non-diversifiable risk and takes into account the asset's sensitivity to non-diversifiable risk, better referred to as beta (β). Embedded in the model is also the market premium which can be tracked using historical data from the local or relevant equity market.

Ke = Rf + (Rm-Rf)*b + Rp, where**:**

Ke – Cost of equity;

Rf - Risk free rate;

Rm - Rentability of the market

Rp- Country risk premium;

B - beta

The factors applied on the calculation of cost of equity are presented below:

- Risk Free rate (Rf): it was based on values of long term rates to TREASURY 20-yr CMT, provided by US Department of Treasury /28/, calculated as the average of 3 month average (mar-may 2008). RINA assessed the validity of the risk free period considered by the project participants, analyzing how the average of different periods of risk free rate would modify the cost of equity applied on investment analysis. Thus, RINA assessed the average from the following periods: 2009-2008, 2009-2008-2007, 2009-2008-2007-2006, 2009-2008-2007-2006-2005 and 2009-2008-2007-2006-2005-2004. It was possible to conclude that the values of the averages from different periods did not present significant variations and that the application of such values do not imply on serious changes on the calculated cost equity of 14.50%, thus value of risk free provided by project participants are appropriate. The results of Rina´s assessment are presented on table below:

Verfied Values to Risk-free Tax		Impacts on ke
Average (2009-2008)	4,22%	14,25%
Average (2009-2008-2007)	4,50%	14,53%
Average (2009-2008-2007-2006	4,64%	14,67%
Average (2009-2008-2007-2006-2005)	4,64%	14,67%
Average (2009-2008-2007-2006-2005-2004)	4,71%	14,75%

- Market risk premium – defined based on PricewaterhouseCoopers Asesores Gerenciales Ltda Spreadsheet market risk premium (no date available) (3 Market Risk Premium Historical returns.xlsx") /28/
- Country Risk premium – The Guidelines on the assessment of investment analysis /37/uses the Moody´s rating while PPs used values from EMBI+ (Emerging Markets Bond Index). PP considered a period of 9 years from 1999 to 2008, what allows considering all market behavior of Colombia until the date of investment decision /28/.
- Beta: For risks of projects in different sectoral scopes, the used index is the Beta. On the Guidance, this index is calculated taking into consideration the following sectors: Energy Industries, Energy Distribution, Energy Demand and Waste handling and disposal. The applied values has been taken from Damodaran Website /28/.,

Input parameters. RINA has validated the input parameters used in the investment analysis and the following steps have been followed to assess the investment analysis:

- Assessment of the period between the time of the investment decision and the starting date of the proposed project activity. All the data used for the investment analysis were available at the time of the investment decision.
- Cross check the input parameters used in the investment analysis. The input parameters used in the financial analysis were cross-checked and all the data sources used for cross-checking were checked during the validation process. The following is carried out:

Input value	**Assessment**
Total investment	1,501,156,038 USD – the value is indicated on spreadsheet “Documento Soporte del Presupuesto -

	Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xls" /53/and verified based on the following studies provided by project Consulting /50/, /51/, /52/
Energy price	46.91 USD/MWh Project participants provided the annex "2.1. Análisis UPME 2008-2022.xls" /32/
Average generation	5,056 (GWh/year) - Ingetec S.A.: Update of designs of tender and environmental impact study - Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, rev. 1, dated 09/06/2008 ("17. Recomendacion de Instalacion para la Central – Documento.tif") /21/
Income Tax	33% - Colombia Congress Law nº 1111, dated 27/12/2006 for the income tax /26/
Operational costs AOM	15.72 USD/KW year Spreadsheet with data for the Operational and Management costs *(no date available)* ("*13. AOM - Sogamoso.xls*"). /30/
Depreciation	25 years /54/
Land Tax	0.38% Ley 56/81, Capitulo II , Articulo 4 (% aplicado sobre el 150% del avalúo catastral /55/

Total Investment- the total investment is composed by the following items, as per investment spreadsheet *"*ISAGEN - Financial Model of the Sogamoso Project - Adjusted Buget - Marzo 6 de 2015.xls" /19/*: Land, Civil works, Equipment, Overhaul (Grandes Mantenimientos), Studies, Engineering, Replacemet works and Other. All these items were verified based on respective unit values presented on spreadsheet* "*Documento Soporte del Presupuesto - Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xls" /53/*on worksheet "PRESUPUESTO INGETEC" column "E". The presented unit values were crosschecked with evidences: Ingetec S.A. – Sogamoso Hydrolectric Project- Basic Design of Dam, Annex civil works and associated equipments, dated 31/10/2006 /50/ Integral Engineering consultant – Optimization study of dam high and installed capacity, dated March, 2008 (annexs C and B); /51/ and Ingetec S.A. - Preliminary budget of Basic Design of Sogamoso Project, dated 21/04/2008 /52/. The unit values of each were multiplied by its respective quantity, resulting in the final value for each item. Based on ISAGEN Sogamoso project chronogram / implementation "*Proyecto Hidroeléctrico Sogamoso- Programa integrado resumido*", 31/07/2010 ("*Cronograma de Implementacion y Curva S Avance.ppt*"). /18/ the total values of each item is calculated in the cash flow, corresponding to the year of its disbursement, updated accordingly to projected inflation rate provided on worksheet "PRESUPUESTO PESOS CORRIENTES" of "*Documento Soporte del Presupuesto - Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xls" /53/*. Due to that, the values presented in work sheet "InvDepTaxes" of investment spreadsheet "ISAGEN - Financial Model of the Sogamoso Project - Adjusted Buget - Marzo 6 de 2015xls," /19/ differs from total applied on PDD, however it does not impacts on calculation of project IRR, once it is based only on cash flows of revenues, taxes and costs. Ingetec S.A, is the consulting company that prepared the projects budget.

Comparison of investment costs per MW among hydropower projects in Colombia:

Project/ Registration number	Capacity (MW)	Total investiment USD 1,000	Investiment per MW USD
Caruquia 9.76 MW Hydroelectric project / 3347	9.76	21,500	2,203
Alto Tuluá Minor Hydroelectric Power Plant / 3570	20.00	53,346	2,667
Bajo Tuluá Minor Hydroelectric Power Plant / 3599	20.00	53,442	2,672
Santiago 2.8 MW Hydroelectric	2.80	4,905	1,752

Project / 4782			

Energy price - electricity price value used in the PDD is US$46.91/MWh. This value was validated against file *"Annex 10 CL 7 Analisis UPME 2008-2022(English).xls"* /32/ and the Plan of Expansion for Generation and Transmission 2008-2022 of the Ministry of Mines and Energy – Department of Mining and Energy Planning /62/. The value in the financial spreadsheet was transformed into Colombian pesos and takes inflation into account.

Comparison of energy price per MW among hydropower projects in Colombia:

Project/ Registration number	Capacity (MW)	Tariff USD /MWh
Caruquia 9.76 MW Hydroelectric project / 3347	9.76	48.55
Alto Tuluá Minor Hydroelectric Power Plant / 3570	20.00	53.20
Bajo Tuluá Minor Hydroelectric Power Plant / 3599	20.00	53.20
Santiago 2.8 MW Hydroelectric Project / 4782	2.80	53,87

O&M costs - represent 3% of income given that income for the first year covered only one month of operation. Likewise, AOM costs in the following years represent 1% of income because they are considered as income during the 12 months of the year. The value of 15.71US$/Kw-year, calculated in reference /30/, was checked against Isagen's SAP system for existing different Isagen plants. To reach the break-even point, the value of the O&M should be down to 0 to get the benchmark.

Comparison of O&M per MW among hydropower projects in Colombia:

Project/ Registration number	Capacity (MW)	Yearly generation (MWh)	Yearly O&M Costs USD ; USD MWh
Caruquia 9.76 MW Hydroelectric project / 3347	9.76	59,800	510,552 ; 8.5
Alto Tuluá Minor Hydroelectric Power Plant / 3570	20.00	114,400	1,062,631 ; 9.3
Bajo Tuluá Minor Hydroelectric Power Plant / 3599	20.00	117,400	981,236 ; 8.4
Santiago 2.8 MW Hydroelectric Project / 4782	2.80	16,662	231,534 ; 13.9

Depreciation - Accounting Depreciation System used in Colombia is *straight line*, which is regulated by the numeral 6 and 10 of Chapter III of the *"Annex 9 CL 5 Manual_Procedimientos_2007.2_Nov2008_Depreciacion Contable.pdf"* of the General Accounting Office, which is attached to this table of responses. It defines the lifetime of 50 years for civil constructions, 25 years for equipment and 5 years for other assets. For tax purposes PP applied accelerated depreciation regulated by Article 2 of Decree 3019 of 1989, which provides 20 years of lifetime for civil constructions, 10 years for equipment and 5 years for other assets. Depreciation established for the calculation of free cash flow includes two values for depreciation, the first value is the accounting depreciation and the second value is the additional tax depreciation taken.

The sum of the two values is the total depreciation for tax purposes and therefore the basis for the current tax calculation.

The optimum average energy generation of 5,056 GWh/year was estimated by Ingetec S.A. /21/ /22/ taking into account marginal benefits for increments of power and the most cost effective configuration suggested by Ingetec S.A. to the PP for the project. As mentioned above Ingetec S.A, is the consulting company that prepared the projects budget. This is in accordance with the guidelines for the validation of the plant load factor /41/.

Based on the information verified, RINA was able to confirm that the input parameters used in the investment analysis are reasonable and adequately represent the economic situation of the project activity at the time of the investment decision.

Calculation and conclusion
The project IRR .calculations were provide in a spreadsheet "ISAGEN - Financial Model of the Sogamoso Project - Adjusted Buget - Marzo 6 de 2015xls," /19/. The calculations were verified and found to be correct by RINA as well as the assumptions used in the calculation were deemed to be correct. The project IRR without CDM revenues is 12.95% which confirms that the proposed project activity in absence of the CDM benefits and compared to the benchmark IRR 14,5% is not financially attractive, while the project IRR with CDM revenues is 13.32%.

Sensitivity analysis
A sensitivity analysis has been carried out for parameters contributing more than 20% revenues and costs, to demonstrated the robustness of the financial analysis. Reasonable variations of the main inputs parameters have been considered by calculating the variation necessary to reach the benchmark, presented in table below:

Variable	IRR without CDM				
	-10,0%	-5,0%	0,0%	5,0%	10,0%
Power Price	11,75%	12,36%	12,95%	13,54%	14,06%
Power generation (GWh/year)	12,17%	12,56%	12,95%	13,32%	13,69%
Civil works (Investment)	13,84%	13,39%	12,95%	12,53%	12,14%
CERE Cost	12,17%	12,56%	12,95%	13,32%	13,69%
Benchmark	14,50%				

The power price was based on project prices from 2008 to 2022, /32/ based on official data from Colombian Government /62/, and it is not likely that energy price achieves the breakeven price. The power price of (US$46.91/MWh) is an estimation of UPME based on the historic prices of energy transactions available from official sources. RINA validation team consulted the statistic of spot prices in the bulk market in Colombia through the data bases of the SIEL (Sistema de Información Eléctrico Colombiano – Colombian Electric Information System), managed by the Mining and Energy Planning Unit of the Ministry of Energy (UPME), Republic of Colombia and the company XM (electricity market operator) /62/. The validation team of RINA deems that the approach used by the PP in estimating the energy prices is adequate and the values used are correct and appropriate. Thus the tariff used is conservative in the CDM/additionality context and therefore accepted by the RINA validation team.

The power generation and CERE Cost is based on installed capacity and operational period of Sogamoso Hydroelectric Project. As per technical evidences (determined by third party, Ingetec /21/) verified during the audit, mainly /22/ /13/ it was verified the it is not possible to project activity present variations power generation because of the physical characteristics of the equipment. The hydrological series data that was used in the graph in figure 6 of the PDD to draw the conclusion that there is a 98% of probability that annual average generation in the long term is between 4,500 and 5,500 GWh/year was presented /64/.

The investment and expenditures, as per investment evidences /50//51//52/are not expected modifications on its values, once it were based on studies and real

	marketing conditions verified at the date of investment decision. Barrier analysis. Not applicable. PDD applies the investment analysis. Common practice analysis. Section B.5. of the PDD correctly classifies the Sogamoso Hydroelectric Project as type (ii) measure, switch of technology with or without change of energy source including use of renewable energies (example: power generation based on renewable energy), listed in the definitions section of the "Tool for the demonstration and assessment of additionality", and as such it also correctly applies the latest "Tool on Common Practice" version 3.1 /65/.: Step 1: The proposed project is of 874.8 MW effective capacity, thus the projects with ±50% design capacity of the proposed project activity (437.4 MW to 1,312.2 MW) are considered as of similar size. Step 2: Colombia, the host country, is chosen as the applicable geographical area. This was assessed as appropriate. Thus 3 criteria have been determined: a) with installed capacity 437.4 MW to 1,312.2 MW, b) located in Colombia and connected to the national interconnection grid; c) started commercial operation before the start date of the project. Step 3: 7 plants have been correctly identified. Step 4: According to PARATEC data /66/, there are 7 projects applying the same technology that the proposed project activity. Hence, Ndiff is determined as 0. Information used is carefully verified and the determination of Ndiff is assessed as reasonable. Step 5: F=1- Ndiff/Nall = 7-7 = 0 Nall - Ndiff = 2. Therefore Nall – Ndiff is 0, the proposed project clearly cannot be taken as common practice in Colombia. In summary, based on our local and sectoral expertise it is RINA's opinion that the additionality of the project is sufficiently demonstrated based on the investment analysis, that the project is not a likely baseline scenario, and that those emission reductions are, therefore, additional.
Findings	CAR 5: Project participants are considering different long term inflation indexes in the benchmark calculations and in the financial analysis calculations. Project participants should align all financial indicators (estimatives). To close CAR 5: Project participants are using the same assumptions of inflation rate in the Financial Analysis and Benchmark calculations. CAR 6: Project participants had presented the positive and negative variations for the parameters (i) Power Price, (ii) Power Generation, (iii) Investment and (iv) Total Expenditures. The purpose of this sensitivity analysis is to assess the impact of more favorable scenarios on the IRR and the economic feasibility of the project, thus PP is requested to present the values to make the project IRR equal to benchmark and provide an assessment of the probability of the occurrence of these scenarios. Furthermore, the published PDD presents (Substep 2d: Sensitivity analysis) an IRR without CDM of 13.97% while the sensitivity analysis spreadsheet "Proyecto Sogamoso - Análisis de Sensibilidad TIR.xlsx" /31/ presents an IRR without CDM of 13.31%. Moreover all other calculation spreadsheets shall be revised accordingly and presented in the working language of the Board, English. To close CAR 6: Project participants properly presented the sensitivity analysis with 10% of variation in each parameter and the value to make the project IRR equal to benchmark and provided an assessment of the probability of the occurrence of these scenarios. CAR 7: PDD version 1 presents the following barriers: financial and water inputs vulnerability. Regarding the financial barrier, as per the additionality tool, this section should present information "other than the economic/financial barriers in Step 2". Therefore, as PP refers to Step 2, the financial barrier presented in the step 3 of the PDD shall be

	excluded. Regarding the barrier of water inputs vulnerability, RINA considers that it is not a "real barrier" to prevent the project implementation, because the project has a firm energy based on historical data of the hydrological records for the period from January 1959 to 2003, calculated by a specialized company Ingetec S.A. /22/. Thus, PP is requested to further explain (other ways/grounds) how this barrier would be alleviated through CDM and how alternatives are prevented by this barrier. To close CAR 7: The barrier analysis was removed from the PDD. Additionality presented in the PDD version 2 is based on the investment analysis. CAR 8: The common practice analysis presented in the PDD version 1 is not totally in accordance to the requirements of the additionality tool /6/. In the sub-step 4a, PP shall provide an analysis of the hydropower plants that are considered similar to the proposed project activity, considering the tool definition: "Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc". For instance, "smaller" power plants (under 20 MW, as per Colombia regulations) are subject to different regulatory conditions and so they shall not be included in the analysis. Moreover, in the sub-step 4b, PP shall identify/discuss essential distinctions between the project activity and similar activities found in the sub-step 4a. PP shall provide documented evidences of the analysis (sources), to allow the assessment and confirmation of all presented information. To close CAR 8: The latest PDD version was updated accordingly to the latest Tool version. CAR 13: As per the published PDD (version 1), the starting date of the project activity is 05/08/2009 as per Isagen Service Order 223-14508 /12/. Nevertheless, the earliest date at which either the implementation or construction or real action of this project activity began is evidenced by the Contract nº46/3147, dated 27/07/2009 /11/. PP is requested to revise PDD accordingly. To close CAR 13: The starting date presented in the PDD version 2 was defined as per Glossary of CDM terms, version 5 and corresponds to the signature of the Contract # 46/3147, for the main construction services. CAR 15: PP shall clarify the difference between the benchmark (14.50%) presented in the benchmark spreadsheet (/27/) and the benchmark (15.47%) presented in the published PDD Table 4. To close CAR 15: PDD was revised accordingly. For the benchmark calculation, please, see CAR 5. CAR 16: PP is requested to provide evidences of the plant load factor calculation (and address it in the PDD), as per the latest version of the "Guidelines for the reporting and validation of Plant load factors" /41/. To close CAR 16: PP has included explanation how the Plant Load factor is in compliance with the "Guidelines for the reporting and validation of Plant load factors". RINA has verified that the Plant Load factor was provided/calculated by a independent third part company INGETEC S.A. CAR 17: Project participants are requested to justify the different periods of data applied on calculation of benchmark. Provide the evidences (with dates and version) of the following inputs applied on the investment analysis described on worksheet "InvDepTaxes" of worksheet "ISAGEN - Financial Model of the Sogamoso Project VF.xlsx": • Civil works (cell C8); • Equipment (cell C10); • Engineering (cell C13); • Replacement works (cell C14).

	Revise the PDD, clearly indicating the investment decision date and verify if the described values of investment analysis are in accordance with the respective spreadsheet. To close CAR 17: The periods applied on calculation of benchmark were properly justified. Nevertheless, the issues raised referents to items of investment analysis are still pending, once the provided evidences do not allow the verification of values applied on it CL 3: In order to be in line with the evidences provided for the CDM consideration, PP shall update the following information in the PDD: the email sent to the Colombia DNA is dated 02/10/2009 and, as per the UNFCCC web site, the notification was received on 16/10/2009. To close CL 3: The dates of dispatch and receipt of the notification to the UNFCCC was clearly indicated in the new version of the PDD. CL 4: Project participants should clarify if it is considered in the Project Sogamoso the investment financing from third parties and what is the equity/debt proportion of the project. If the financing is being considered in the project, project participants should revise the financial analysis and/or the benchmark analysis to adequate it to the paragraph 12 of the latest "Guidelines on the assessment of investment analysis" version (/37/): "…benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented". To close CL 4: Project participants properly clarified the question about investment financing from third parts and justify that the possibility to third part financing occurred after the project starting date. CL 5: The depreciation was taken into account, however the depreciation system applied is not clear. Project participants shall clarify the chosen depreciation system, including the distinction between "tax depreciation" and "accounting depreciation", the depreciation periods and justify the reason to apply in the income tax calculations just the difference between "fiscal depreciation" and "accounting depreciation". Official sources from local institutions or government about depreciation system in Colombia should be provided. To close CL 5: PPs clarified that the "Other Assets" items are related to assets that will not be owned by ISAGEN and therefore are not be included in the depreciation calculation. CL 6: There is a salvage value in the end of the cash flow, however this salvage value was not calculated taken into account the depreciation and the return of the working capital, it is a calculation with the last year cash flow and a cost of capital value. Project participants shall justify the salvage value calculations. According to the EB 51 – Guidelines on the assessment of the investment "It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets". To close CL 6: Project participants clarified the calculations of "terminal value" at the end of the cash flow. CL7: Project participants provided the annex "2.1. Análisis UPME 2008-2022.xls" /32/ with an estimative of electricity price in Colombia from 2008 until 2022, however it is not evidenced the values used in the financial analysis. Project participants shall indicate in the annex "2.1. Análisis UPME 2008-2022.xls" where are the values used in the financial analysis calculations and should demonstrate the sources of the data used in this estimative. Furthermore, PP is requested to explain the electricity price value of 46.91 USD/MWh (2008) presented in the annex "2.1. Análisis UPME 2008-2022.xls" /32/ while the published PDD mentions (Table 5) a value of 46.92 USD/MWh (2008). To close CL 7: Project participants clarified the submission of electricity prices. There is in all years a short, and not relevant, deviation from evidence document to Financial

	Analysis values. CL 8: In the IRR spreadsheet, there is a worksheet “Ingresos” with all revenues of project Sogamoso. There are seven different revenues lines (CIF, Regulado, Ventas Bolsa, Cargo Confiabilidad, Ventas AGC and Transacciones Forzadas). Project participants shall clarify the characteristics of each revenue line in the worksheet “Ingresos”, summarizing how is calculated/estimated the price, what is the proportion in the electricity generation and if is based in contracts, auctions, free negotiations, etc. All evidences about calculated/estimated revenues shall be provided. To close CL 8: Project participants clarified all kinds of income in the project and provided the documentation about these kinds of contracts. CL 9: In the Financial Analysis project participants are considering a total amount of Costs and Expenses that are about 45% of the yearly total revenues. Almost all lines of Costs are about Taxes and Tariff over the electricity generation. Project participants provided some documents (as the law 99 /29/ and spreadsheet “O&M Costs” /30/) but there are no evidences or is difficult to identify and to check the related document for some lines (for instance: Capacity Charge, Final CFI, Law 99, FAZNI, CND-ASIC, CREG-SSPD, Insurance and Land Taxes) and to validate the applied value in the financial analysis with the number presented in the document (it is difficult to cross check the values used in the financial analysis). Project participants shall provide the evidences for all relevant costs, expenses and taxes (including an explanation about the application of taxes other than income tax and depreciation) and shall present in the financial analysis a note with the name of the document and if necessary a note about the applied value/s. To close CL 9: Project participants presented the details and descriptions of all Costs and Expenses. For the most relevant lines project participants presented documents with the methodology for calculations. CL 10: The O&M Costs presented by project participants is about 3% of total revenues in the first operational year and about 1% in the last year of operation. Project participants shall explain the calculations to estimate the O&M costs (named in the financial analysis spreadsheet “AOM”), shall clarify the small participation of this important line in the total cost amount and shall justify the reason to index this spending to the USD instead of the local currency, which generates the lowest share of this spending in the end of the project life. To close CL 10: Project participants properly justified the O&M Costs in the Financial Analysis. CL 11: Project participants shall provide the composition of all these investment items with proper evidences (sources) to confirm the presented values. To close CL 11: Project participants are being supported by a company with experience in this kind of project. The investment budget of the project was detailed by project participants and the contracted company. CL 12: Project participants shall provide in the financial analysis spreadsheet an easier way to reproduce the sensitivity analysis results presented in PDD. To close CL 12: Project participants adjusted the financial analysis model as requested. The sensitivity analysis could be reproduced and the results are aligned with PDD. CL 13: Since the 10% variation for all parameters didn’t presented an IRR more favorable than the benchmark, it would be more useful to show how large should be these variations to make the project IRR equal the benchmark. Then a second analysis should be applied to discuss the likelihood of occurrence of these scenarios.

	To close CL 13: Project participants provided an assessment of the probability of the occurrence of these scenarios
Conclusion	. By assessing the evidences presented and cross-checking the information contained in, RINA considers the reasoning for the proposed project additionality demonstration is credible and reasonable i.e. the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered CDM project activity.

D.8.7. Emission reductions

Means of validation	The emission reduction ER_y by the proposed project actiity during the crediting period is the difference between baseline emissions (BE_y), project emission (PE_y) and emissions due to leakage (L_y) as follows. **Baseline emissions.** In accordance with the applied methodology, the baseline emissions are calculated as follow: BEy= EGPJ,y*EFgrid,CM,y BEy= 5,056,000 * 0.2742 BEy= 1,386,355 tCO2/y Where: BEy= Baseline emissions in year y (tCO2) EGPJ,y= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh) EFgrid,CM,y = Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh) Calculation of EGPJ,y (a) Greenfield renewable energy power plants If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then: EGPJ,y = EGfacility,y Where: EGfacility,y= Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh). The energy delivered to the grid was estimated by a third part company = = 5,056,000 MWh/y /21/. For the EFgrid,CM,y PP has used the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh)., using the most recent data available by the Colombia Government /38//39//42/ at the time of PDD publication , considering the National Interconnected System (Colombian) and the dispatch data analysis. PP has used data available by the National Dispatch Center (CND) and Energy Mining Planning Unit (UPME) for the year 2008 (estimative ex-ante) /38//39//42/ and it will be updated during the verification (data vintage ex-post). For the Operating Margin (EFgrid,OM-DD,y) 0.3337 tCO2/MWh and For the Build Margin (EFgrid,BM,y)=) 0.2146 tCO2/MWh. The combined emission factor (EFgrid,CM,y) EFgrid,CM,y = EFgrid,OM,y * wOM + EFgrid,BM,y * wBM Where: EFgrid,BM,y = Build margin CO2 emission factor in year y (tCO2/MWh) EFgrid,OM,y = Operating margin CO2 emission factor in year y (tCO2/MWh) wOM = Weighting of operating margin emissions factor (%) wBM = Weighting of build margin emissions factor (%)

	The default values used for wOM (=0.5%) and wBM (=0.5%) in the PDD are in accordance with the tool, resulting EFgrid,CM,y= 0.2742 tCO2/MWh. **Project emissions** Project emissions are not applicable to the project activity in accordance with the methodology, as power density is greater than 10 W/m2 (11.53 W/m2). **Leakage** Leakage does not need to be considered, as defined by the applied baseline methodology. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions rising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected. **Emission Reductions** ERy= BEy-PEy As PEy= 0, ERy= BEy, therefore, ERy= EGPJ,y*EFgrid,CM,y ERy= 5,056,000 * 0.2742 ERy= 1,386,355 tCO2/y
Findings	CL 14: During site visit, it was possible to check that the emission factor is calculated automatically by a program, using the information public available from Colombia National Dispatch Center (CND-XM) through the database Neon, and data from the Energy Mining Planning Unit (UMPE). Moreover, PP provided a spreadsheet with an example of calculation for 2 days ("FE 2008 a Rina 22jun10.xlsx"). However, for transparency, PP shall prepare a spreadsheet (reproducible) where it is possible to confirm all the emission factor data and calculations. To close out CL 14: The revised procedures to determine the build margin presented in the tool version 2.2.0 and 2.2.1 do not affect the results presented in the emission factor spreadsheet because the initial calculations made by the Projects Participants agree with the steps included in the new version of the tool. CL 15: PP shall clarify (source) the formula used in the sub-step 4.2 of the calculation of the Grid emission factor presented in the PDD version 1. The presented formula is not mentioned in the "Tool to calculate the emission factor for an electricity system" /7/. Moreover, the latest version of the referred Tool shall be applied in EF calculations and spreadsheet/s and published PDD shall be revised accordingly, as per Tool steps. To close CL 15: The available version 2.2.1 of the tool was included in the PDD, the modifications can be seen in the PDD version 3
Conclusion	. It is RINA's opinion: (a) All assumptions and data used by the PP are listed in the PDD; (b) All documentation used by the PP as the basis for assumption and source of data is correctly quoted and interpreted in the PDD /05/ /10/ /12/ /13/ /15/ /16/ /29/ /28/ /30/ /32/ /49/ /50/; (c) All values used in the PDD and CERs spreadsheet. including GWPs are considered reasonable in the context of the proposed project activity (d) The baseline methodology and methodological tools have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions; 05/ /08/ /09/ /10/ /12/ /13/ /14/ /15/ /16/ /27/ (e) All estimates of the baseline emissions can be replicated using the data and parameters values provided in the PDD and CERs spreadsheet.

D.8.8. Monitoring plan

Means of validation	The approved baseline and monitoring methodology ACM0002 /2/has been applied.

The monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology; no deviations relevant to the project activity have been found in the plan.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.

Parameters determined ex-ante

The ex-ante parameters that are mentioned in the methodology are included in the PDD and are provided in compliance with the methodology:

	Data/parameter	Unit	Value applied	Assessment
1	A_{BL}: Area of the reservoir before the implementation of project activity	m^2	0	Parameter used to calculate the power density of the power plants. As per ACM0002, version 16.0 /2/, for new hydro power plants, this value is zero
2	Cap_{BL}: Installed capacity of the small hydro power plant before the implementation of the project activity	W	0	Parameter used to calculate the power density of the power plants. As per ACM0002 version 16.0 /2/, for new hydro power plants, this value is zero

Parameters monitored ex-post

The ex-post parameters that are mentioned in the methodology are included in the PDD and are provided in compliance with the methodology, and they will be monitored during the crediting period:

	Parameter	Description/Assessment
1	CAP_{PJ} (Installed capacity of the hydro power plant after the implementation of the project activity (Maximun Installed Capacity of the hydro power plant): W	This parameter is based on the generators' nameplate and the generator's guaranteed technical characteristics agreed with the manufacturer. Parameter will be monitored once at the beginning of the crediting period, as requested by the applied methodology.
2	A_{PJ} (Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full): m^2	The area will be Measured from satellite pictures once in the beginning of the crediting period, as required by the applied methodology.
3	$EG_{facility,y}$ (Quantity of net electricity generation supplied by the Project plant to the Grid in every hour of year *y):* MWh/y	The Quantity of net electricity generation supplied by the Project plant to the Grid will be directly measured by the metering systems installed at the approved commercial frontiers installed in the interconnection substation. The measurement will be conducted and recorded hourly and daily sent to the CND. The parameters quantity of electricity supplied to the grid by the Project and quantity of

			electricity supplied to the Project by the grid will be measured as required by the applied methodology. Technical characteristics of measurement systems to be implemented in Sogamoso power plant will be in line with the provisions of the Resolution 025 of 1995 of the CREG or its modifications which currently requires an accuracy of 0.2 /63/. Meters will be calibrated according to the relevant standards or regulatory norms. ISAGEN has a verification and re-calibration program of measuring equipment every two (2) years.
	4	$EG_{n,n}$ (Electricity generated and delivered to the Grid by power unit m in year y): MWh	The electricity generation from each power plant connected to the Grid will be monitored and sent to the CND[7] by on site metering equipment at the substation of each power plant. This process is in charge of each power plant belonging to the group of power plants corresponding to this monitored parameter. In Colombia, The Measurement Code "Codigo de Medida" establishes mandatory high technical standards, conditions and procedures for reading, registering and recording activities for electricity transactions performed in the Colombian Energy Market. This code is part of the Resolution 025 of 1995 of the CREG[7], which is followed for electricity output measurements.
	5	$EG_{m,y}$ (Net quantity of electricity generated and delivered to the Grid by power unit m in year y): MWh	The electricity generation from each power plant connected to the Grid will be monitored and sent to the CND by on site metering equipment at the substation of each power plant. This process is in charge of each power plant belonging to the group of power plants corresponding to this monitored parameter. In Colombia, The Measurement Code "Codigo de Medida" establishes mandatory high technical standards, conditions and procedures for reading, registering and recording activities for electricity transactions performed in the Colombian Energy Market. This code is part of the Resolution 025 of 1995 of the CREG /38/, which is followed for electricity output measurements
	6	$EF_{EL,n/m,y}$ (CO_2 emission factor of power unit *n* or *m* in year *y): tCO_2e/MWh*	The set of factors calculated ex-ante will be reviewed each year of the crediting period based on the official and publicly available data. If necessary, in order to define the CO_2 emission factors of each power plant of the Grid during verifications, parameters like efficiency of each power plant, type of fuel consumed by each power plant, fuel consumed per power plant and net calorific value of each type of fuel will be acquired from official and publicly available sources. With the necessary parameters, CO_2 emission factor of power unit n or m will be calculated using the appropriate equations of the "Tool to calculate the emission factor for an electricity system". Data from UPME is used. /42/
	7	$EF_{grid,CM,y}$ (Emission factor of the National Interconnected System (The Grid) tCO_2e/MWh	Mathematical calculation that incorporates the parameters $EG_{n,h}$, $EG_{m,y}$, $EF_{EL,n/m,y}$ and Merit order. Data will be archived during the whole crediting period and until two years after the end of the crediting period or the last issuance of CER´s for

			this project activity, whichever occurs later.
	8	Merit order (Merit order of plants that generate energy to satisfy national hourly demand)	Data provided by the CND. The merit order in the Colombian electricity market is being established using two variables: 1) the programmed electricity generation and 2) the bidding price of every unit connected to the National Grid. Under the SIN, the CND /39/ is responsible for managing and operating the SIN dispatch. The CND schedules the dispatch of generators by strict economic order, considering the need to satisfy the demand within the technical parameters of reliability and continuity defined by the CREG /38/. The outcome is the hourly generation program for each power unit and the hourly marginal cost for the SIN (the cost of producing an additional kWh of energy in the system equals the highest operational cost of units in operations in a particular time). All monitored and collected data is subject to auditing and verification

Management system and quality assurance
The net electricity delivered to the grid will be hourly measurement and monthly recording and checked through the electricity meters (one main and one back-up). The meters must comply with national standards stated by Colombian rules, and industry regulation to ensure the accuracy.
The calibration of meters will be conducted by a qualified organization that must comply with national standards and industrial regulations to ensure the system accuracy, in accordance with project standard para. 97c. The periodicity of the calibration will follow the Resolution 025 of 1995 (Resolution 025 de 1995) from the CREG. After calibration, the meters must be sealed for safety and the calibration certificates must be recorded with other monitoring records. The class of accuracy of the equipment that will be used in the project activity is under the national standards (0.2, according to the IEC norm and the resolution CREG 25 from 1995).
Besides electricity measurements performed by the project owners, all the energy generated by SHP
ISAGEN is responsible for the maintenance and calibration of the monitoring equipment, compliance to operational requirements and corrective actions related to the functionality of the project activity. Moreover, the company has authority and responsibility for registration, monitoring, and measurements as well as managing all the issues related to the project activity and to organize staff training to use appropriated techniques in those procedures.

Findings

CAR 9 : As per the “Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)”, , the section B.6.2 of the PDD shall “include a compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period and that are available when validation is undertaken. Data that becomes available only after validation of the project activity (e.g. measurements after the implementation of the project activity) should not need to be included here but in the table in section B.7.1”. Section B.6.2 of the PDD version 1 shall be revised as per the Guidelines.

To close CAR 9: PDD was revised and is in accordance with the requirements of the guidelines for completing the project design document (CDM-PDD) and the applied methodology.

The parameters available at validation are:

$\mathbf{A_{BL}}$: Area of the reservoir before the implementation of project activity (Km^2): 0

(As per ACM0002, for new hydro power plants, this value is zero).

$\mathbf{Cap_{BL}}$: Installed capacity of the small hydro power plant before the implementation of the project activity (MW): 0 (As per ACM0002, for new hydro power plants, this value is zero).

CAR 10 : As per the applied methodology, the following parameters shall be

	available at validation: *CapBL: Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero. *ABL: Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m2). For new reservoirs, this value is zero. To close CAR 10: PDD was revised accordingly. The parameters available at validation are in accordance with the applied methodology. CAR 11 : The parameters CAPPJ and APJ shall be presented in PDD section B.7.1 and included in the monitoring parameters of the project activity. Moreover, the parameter EFgrid,CM,y shall be included in the monitoring plan. To close CAR 11: The parameters were correctly included in the PDD version 3. CAR 12 : PPs shall revise the PDD according to the "Guidelines for completing the project design document (CDM-PDD)" (data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later). To close CAR 12: PDD was revised accordingly and data will be achieved as per the requirements of the Guidelines.
Conclusion	It is RINA's opinion that the monitoring plan is in accordance with the monitoring methodology; the monitoring plan will give opportunity for real measurement of achieved emission reductions. RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology and methodological tools; no deviations relevant to the project activity have been found in the plan. RINA confirms that the monitoring arrangements described in the monitoring plan, including the data management and quality assurance and quality control procedures, are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified

D.9. Duration and crediting period

Means of validation	A renewable crediting period of 7 years was selected (with the potential of being renewed twice), starting on 01/01/2016 or at the time of the Project's registration, whichever is later. The length of the crediting period is clearly defined and deemed reasonable for this project activity. The total GHG emission reductions from the Sogamoso Hydroelectric Project are estimated to be 9,704,486 tCO_2e during the first renewable 7 years crediting period, resulting in an annual average emission reductions of 1,386,355 tCO_2e / year.
Findings	CAR 13: As per the published PDD (version 1), the starting date of the project activity is 05/08/2009 as per Isagen Service Order 223-14508 /12/. Nevertheless, the earliest date at which either the implementation or construction or real action of this project activity began is evidenced by the Contract nº46/3147, dated 27/07/2009 /11/. PP is requested to revise PDD accordingly. To close out CAR 13: The starting date presented in the PDD version 2 was defined as per Glossary of CDM terms, version 5 and corresponds to the signature of the Contract # 46/3147, for the main construction services.
Conclusion	It is RINA's opinion that, expected operational lifetime, type and duration of the crediting period and star date of the crediting period described in the PDD are in accordance with the provisions of the Project Standard.

D.10. Environmental impacts

Means of validation	The environmental aspects of the project activity were analysed by the Ministry of Environmental Housing and Territorial Development /17/, which is authority competent to issue the licenses for the project activity. The EIA /16/ is required by

	the Ministry of Environment Housing and Territorial Development. The Resolution 0206 of 2009 /17/, granted the pertinent environmental license for the project activity.
Findings	CL 16: The PDD version 1 describes the environmental impacts and its monitoring, compensation or restoration activity. PP shall specify/ make clear in the PDD the programs that are additional to the ones required by the environmental agency. To close out CL 16: PP has revised the PDD in order to make transparent the compulsory programs and the voluntaries one. The environmental agency is responsible to check the compulsory programs. CL 17: PP shall provide the applicable semi-annual environmental reports presented to the environmental agency, as per the requirements of the Environmental Management Plan /16/. To close CL 17: PP has provided the report for the Access Roads works ("*ICA-01-ISAGEN-46-2989-2009.pdf*") and the report for the Main Works ("*Texto Primer ICA Obras Principales.pdf*").
Conclusion	RINA verified that environmental aspects of the project activity were analyzed by the environmental agency when it issued the licenses.

D.11. Local stakeholder consultation

Means of validation	The local stakeholder consultation was conducted in 05/10/2009, before the publication of the PDD in the UNFCCC web site. Considering the area of Project influence, on 13/11/2009 a forum was held addressing Hydropower, Sustainable Development and was organized by the International Hydropower Association, ISAGEN S.A E.S.P., Fundación Natura – Colombia and PricewaterhouseCoopers – PwC. In this forum, ISAGEN S.A. E.S.P presented to the participants the Hydroelectric Sogamoso Project structure within the framework of Clean Development Mechanism (CDM). PP presented to RINA a letter from Setecsa, confirming that 280 invitations for the Forum were sent through the Companies Colombia Express and Servicios Postales de Colombia 4_72. A list with the Persons name, position and Entity is provided along with the letter. Also, the invitation to the forum was published in a local press and ISAGEN web site /24/. Moreover, PP provided a list signed by the local stakeholders that participated in the Forum, held in Bucaramanga, on 13/11/2009. The list contains the name, position, entity, telephone, email, address and city of the stakeholders. Representatives of government entities, environmental authorities, private companies, mixed companies (public and private), local media, non-governmental, associations, corporations, foundations and cooperatives were present in the Forum. PP provided the formularies used by stakeholders to raise their questions during the forum /24/. The list of the questions discussed during the Forum, with PP answers, is presented (summary) in the PDD (E.2). At the time of the site visit, Colombia did not have a local law regarding the local stakeholder consultation. PP provided to RINA pictures of the Forum and the presentations from International Hydropower Association, Fundación Natura, and PricewaterhouseCoopers – PwC /24/. Moreover, during site visit, RINA had the opportunity to interview Mr. Leonardo Ardilla, from CEN – UNAB, involved in the Employment program and three representatives of different communities affected by the project activity: Mr. Juan Tercero - Community leader- Ciniega El Llanito Fishermans community (Barrancabermeja municipality), Mr. Antonio Joia Caballero - Community leader- Casa de Barro community (Betulia municipality), Mrs. Esperanza Gil - Community leader Plazuela community (Zapatoca municipality). It was possible to confirm that the local stakeholder consultation was adequately conducted and that the local community leaders showed a good knowledge of the project activity and no major concerns were raised.
Findings	CL 1: In the PDD version 1 it is mentioned that "Sogamoso Hydroelectric Project, owned by ISAGEN which is an environmentally and socially responsible Company,

	complies and incorporates strategic principles, criteria and guidelines established by the World Commission on Dams about policies and corporate expressions of social responsibility". PP shall clarify or provide evidences of the compliance with WCD criteria's. To close out the CL 1: , PP's have attached to this table of responses the signed contract with the Spanish Association of Standardization and Certification for the validation of the strategic principles, criteria and guidelines according to the World Commission on Dams
Conclusion	Rina concludes that the local stakeholder consultation was conducted in a transparent manner.

SECTION E. Internal quality control

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

SECTION F. Validation opinion

RINA Services Spa (RINA) has performed validation of the project activity Sogamoso Hydroelectric Project in Colombia, with regard to the relevant requirements for CDM activities.

The review of the project design document and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfilment of the stated criteria.

The host Party is Colombia. Colombia fulfils the requirements to participate in the CDM. The project is an unilateral project thus no Annex I Party is identified The project participants are PricewaterhouseCoopers Asesores Gerenciales Ltda and ISAGEN S.A. E.S.P..

The DNA from Colombia confirmed that the project assists in achieving sustainable development.

The project correctly applies the approved baseline and monitoring methodology ACM0002 – "Grid-connected electricity generation from renewable sources" Version 16.0 of 28/11/2014. By generating renewable energy from hydro power plants the project results in reduction of CO2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the activity Sogamoso Hydroelectric Project are estimated to be on an average 1,386,355 tCO2e per year over the selected 7 years renewable/ crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA's opinion that the project participants are able to implement the monitoring plan.

In conclusion, it is RINA's opinion that the project activity Sogamoso Hydroelectric Project in Colombia, as described in the version 08 of 10/06/2015, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 16.0 of 28/11/2014.

RINA provides the validation opinion that the all of coverage for the project components or issues are deemed being validated through the validation process. RINA thus requests registration of the project as a CDM project activity.

Hence RINA requests the registration of the project as a CDM project activity.

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CDM-PCP	Clean Development Mechanism Project Cycle Procedure
CDM-PS	Clean Development Mechanism Project Standard
CDM-VVS	Clean Development Mechanism Validation and Verification Standard
CER(s)	Certified Emission Reduction(s)
CH_4	Methane
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MOC	Modalities of Communication Statement
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change

Appendix 2. Competence of team members and technical reviewers

RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: **Vicente San Valero**

We declare that Mr/Mrs/Ms:

è qualificato come[1]: **CDM (TEC, VAL, VER, TL, FIN-EXP, ITR) VCS, GS, SCS (VAL, VER, TL)**
is qualified as:

per le seguenti aree tecniche: **1.2, 2.1, 4.6, 13.1**
for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.2	Energy generation from renewable energy sources	1
2.1	Electricity Distribution	2
4.6	Electrical / Electro technical products	4
13.1	Waste handling and disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	31-01-2008	-
9	01-06-2012	Annual revision

Il Resp. QPT
Head of QPT

[1] Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard:
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologics Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologics Institute, to carry out Validation and Verification of SCS Reports

GHG_QUAL_CERT_EN_04_12 Page 1 of 1

RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: **Geisa Maria Principe Branco Saettoni**

We declare that Mr/Mrs/Ms:

è qualificato come[1]: **CDM-TEC, VAL, VER, TL**
is qualified as:

per le seguenti aree tecniche: **1.1, 1.2, 13.1**
for the following technical areas:

AREE TECNICHE *TECHNICAL AREAS*	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.1	Thermal Energy generation	1
1.2	Energy generation from renewable energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	27-08-2009	-
9	17-07-2015	Updating qualification according AS version 6

Il Resp. QPT
Head of QPT

[1] Legend:
VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner
CDM: Clean Development Mechanism
VCS : Verified Carbon Standard:
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

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RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: / *We declare that Mr/Mrs/Ms:* **Thais De Lima Carvalho**

è qualificato come[1]: / *is qualified as:* **CDM -TEC, -VAL, -VER, -TL**

per le seguenti aree tecniche: / *for the following technical areas:* **1.1, 1.2, 2.1, 13.1**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.1	Thermal energy generation	1
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	19-08-2009	-
12	15-01-2015	Added TA 2.1

Il Resp. QPT
Head of QPT

[1] Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

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RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: *We declare that Mr/Mrs/Ms:*	**Cintia Mara Miranda Dias**
è qualificato come[1]: *is qualified as:*	**CDM (TEC, VAL, VER, TL, FIN-EXP)** **SCS (VAL, VER, TL)**
per le seguenti aree tecniche: for the following technical areas:	**1.2, 13.1, 13.2, 15.2**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.2	Energy generation from renewable Energy sources	1
13.1	Waste Handling and Disposal	13
13.2	Animal waste management	13
15.2	Animal waste management	15

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	03-11-2008	-
8	01-06-2012	Annual revision

Il Resp. QPT
Head of QPT

[1] Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard:
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

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RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: *We declare that Mr/Mrs/Ms:*	**Tiago Mendonca De Oliveira**
è qualificato come[1]: *is qualified as:*	**CDM-FIN-EXP**
per le seguenti aree tecniche: for the following technical areas:	-

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
-	-	-

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	20-10-2010	-
2	01-06-2012	Annual revision

Il Resp. QPT
Head of QPT

[1] Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard;
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

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GHG_QUAL_CERT_EN_04_12 Page 1 of 1

RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: **Americo Junior Varkulya**

We declare that Mr/Mrs/Ms:

è qualificato come[1]: **CDM –TEC, -VAL,-VER,-TL, -FIN EXP**
is qualified as:

per le seguenti aree tecniche: **1.1, 1.2**
for the following technical areas:

AREE TECNICHE *TECHNICAL AREAS*	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.1	Thermal energy generation	1
1.2	Renewables	1

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	30-01-2009	-
13	22-12-2014	Update qualification according to AS v6.0

Il Resp. QPT
Head of QPT

[1] Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologics Institute per condurre la Validazione e la Verifica di rapporti SCS

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RINA

CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra: *We declare that Mr/Mrs/Ms:*	**Rita Valoroso**
è qualificato come1: *is qualified as:*	**CDM -TEC, -VAL, -VER, -TL TECHNICAL REVIEWER**
per le seguenti aree tecniche: for the following technical areas:	**1.2, 13.1**

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA *TECHNICAL AREA DESCRIPTION*	SCOPO SETTORIALE *SECTORAL SCOPE*
1.2	Renewables	1
13.1	Solid Waste and waste water	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE *REVISION*	DATA *DATE*	MOTIVAZIONI PER LA REVISIONE *REASON FOR THE REVISION*
0	18-01-10	-
9	22-12-2014	Update qualification according to AS ver.6.0

Il Resp. QPT
Head of QPT

1 Legend:

VAL:	Validator	CDM: Clean Development Mechanism
VER:	Verifier	VCS : Verified Carbon Standard
TEC:	Technical Expert	GS: Gold Standard
TL:	Team Leader	SCS: SocialCarbon Standard
FIN-EXP:	Financial Expert	JI: Joint Implementation
DET:	Determiner	

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RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	ISAGEN S.A. E.S.P. and PricewaterhouseCoopers Asesores Gerenciales Ltda	CDM-PDD for project activity CDM-PDD for project activity Sogamoso Hydroelectric Project in Colombia	Version 8 of 10/06/2015 version 07 of 04/03/2015 Version 5 of 22/07/2013 Version 4 of 16/07/2012. Version 3 of 28/11/2011. Version 2 of 04/08/2011. Version 1 of 21/06/2010	PP
/2/	CDM Executive Board	Baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"	Version 16.0 of 28/11/2014 version 12.1.0 of 26/11/2010 version 11 of 12/02/2010	Other
/3/	CDM Executive Board	Clean Development Mechanism Validation and Verification Standard.	Version 9 of 20/02/2015	Other
/4/	CDM Executive Board	"Guidelines for completing the Project Design Document", version 01.0, "Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)", version 7 of 02/08/2008.	dated 02/03/2012 (EB66 - Annex 8). version 7 of 02/08/2008.	UNFCCC
/5/	CDM Executive Board	"Guidelines on the demonstration and assessment of prior consideration of the CDM"	version 04, dated 15/07/2009.	UNFCCC
/6/	CDM Executive Board	"Tool for the demonstration and assessment of additionality."	Version 07.0 of 23/11/2012 (version 5.2), dated 26/08/2008	Other
/7/	CDM Executive Board	"Tool to calculate the emission factor for an electricity system"	Version 05.0, dated 27/11/2015 version 04.0, dated 04/10/2013 version 03.3.0, dated 23/11/2012 version 02, dated 16/10/2009	Other
/8/	CDM Executive Board	Glossary of CDM terms	version 07, dated 23/11/2012 version 06, dated 02/03/2012 version 05, dated 19/08/2009	Other
/9/	PricewaterhouseCoopers Asesores Gerenciales Ltda	PwC: Emission reductions calculation spreadsheet - "*ER Calculation to Rina 26may11.xlsx*", dated 26/05/2010.		PP
/10/	PricewaterhouseCoopers Asesores	Colombian Emission Factor calculation spreadsheets: "*BM Calculation.xlsx*"	dated 08/08/2011 dated 22/06/2010.	PP

	Gerenciales Ltda	"*EF Sogamoso 2008.xlsx*", ($EF_{grid,CM,y}$ = 0.2742 tCO_2e/MWh for year 2008; $EF_{grid,BM,y}$ = 0.2146 tCO_2e/MWh and $EF_{grid,OM,y}$ = 0.3337 tCO_2e/MWh; $W_{OM} = W_{BM}$ = 0.50%). Colombian Emission Factor calculation spreadsheet - "*FE 2008 a Rina 22jun10.xlsx*", dated 22/06/2010.		
/11/	ISAGEN S.A. E.S.P. and Grupo I C T S.A.S	Contract nº46/3147, signed between ISAGEN S.A. E.S.P. and Grupo I C T S.A.S. for the main civil works dated 27/07/2009 ("*Proyecto Sogamoso - Contrato 46-3147 Starting Date.pdf*").	dated 27/07/2009	PP
/12/	ISAGEN S.A. E.S.P. and Grupo I C T S.A.S	Isagen Service Order 223-14508 to Grupo I C T S.A.S. dated 03/08/2009. Establishes that the start of the first work for the Sogamoso project is 05/08/2009 (starting date) and this is the date that contractual period starts ("*Proyecto Sogamoso - Orden de Inicio Contrato 46-3147 – Tunel.pdf*" - *project's starting date evidence, in Spanish*).	Dated 03/08/2009	PP
/13/	ISAGEN S.A	Isagen description of the projects equipments, "LICITACIÓN PÚBLICA NO. 5/418" (public bidding NO. 5/418) - generator, Section 2, page 5 of "*CC Cap 2-Parte II-5-418.pdf*"	No date	PP
/14/	National Society of Mining, Oil and Energy	Article "Renewable energy: advantages and disadvantages that should be meditated" (from Spanish "*Energías renovables: ventajas y desventajas que se deben meditar*") published in the web link: http://www.reddeenergia.com/mostrarnoticia.php?idnoticia=17314	accessed on 09/07/2010	Other
/15/	Münchener Rück - Munich Re Group	Lifetime - paper from the Münchener Rück - Munich Re Group entitled "*Tecnología para underwriter - 38 Centrales hidroeléctricas.pdf*" (2009).	2009	Other
/16/	ISAGEN S.A	Updated Environmental Impact Study (from Spanish "Actualización del studio de impacto ambiental") for the Sogamoso Hydropower Plant, document number E2-6.1-006, volumes 1 to 6, dated December, 2008 and Ingetec S.A., Synthesis of the environmental impact study (carried out in 2008) of the Sogamoso hydroelectric project - "*SINTESIS ESTUDIO DE IMPACTO AMBIENTAL_SOGAMOSO.pdf*".	dated December, 2008	PP
/17/	Ministry of Environment Housing and Territorial Development (Ministerio de Ambiente, Vivienda y Desarrollo Territorial)	Resolution 0206 of 09/02/2009 (granted the pertinent environmental license to start the implementation of the project activity).	Dated 09/02/2009	Other
/18/	ISAGEN S.A	Sogamoso project chronogram / implementation "*Proyecto Hidroeléctrico Sogamoso- Programa integrado resumido*", 31/07/2010 ("*Cronograma de Implementacion y Curva S Avance.ppt*").	Dated 31/07/2010	PP
/19/	ISAGEN S.A	Financial Spreadsheet - *"ISAGEN - Modelo Financiero Proyecto HidroelectricoSogamoso - English Version.xlsx"* , dated 21/07/2010 no version	Several dates listed after the file name.	

		ISAGEN - Financial Model of the Sogamoso Project - Adjusted Buget - Marzo 6 de 2015xls, dated 06/03/2015 – no version		
/20/	ISAGEN S.A	ISAGEN Cashflow - "*PROJECT CASHFLOW21jun10aRina.pdf*",	dated 21/07/2010.	PP
/21/	Ingetec S.A.:	Update of designs of tender and environmental impact study - Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, rev. 1, dated 09/06/2008 ("*17. Recomendacion de Instalacion para la Central – Documento.tif*").	Rev. 1, dated 09/06/2008	PP
/22/	Ingetec S.A.:	Inform of energetic studies to the selection of the useful volume of the dam (from Spanish: Informe de estudios energéticos para la seleccion del volumen útil del embalse), revision 3, document number E1-1.5-005B-R3, dated 29/06/2008 ("*Informe de estudios energéticos parte I.pdf*"; "*Informe de estudios energéticos parte II.pdf*").	dated 29/06/2008	PP
/23/	**ISO CERTIFICATES**	* ISO 9001:2008, # SC-193-1 / ICONTEC, First issuance on 17/03/1999, Valid until 26/02/2011; * ISO 14001:2004, # SA-073-1 / ICONTEC, First issuance on 28/05/2003, Valid until 05/03/2011; * ISO 180011:2007, # CO-OS-097-1 / ICONTEC, First issuance on 11/05/2010, Valid until 10/05/2013.	Several dates listed after the file name.	PP
/24/	Ingetec S.A.:	Local stakeholder process: *Setecsa letter, dated 30/11/2009, confirming that 280 invitations for the Forum were sent (on 05/11/2009) through the Companies Colombia Express and Servicios Postales de Colombia 4_72. A list with the Persons name, position and Entity is provided along with the letter. *Isagen invitation to the Forum published in the Isagen web site: http://www.isagen.com.co/comunicados/Foro_Hidroelectricidad.pdf <accessed on 09/09/2010 (in Spanish); * Isagen invitation to the Forum published (on 09/11/2009) in the local press; * Copy of the formularies with the questions raised during the Forum; * Copy of the list signed by the local stakeholders * Copy of the presentations of Asociación Internacional de Hydroelectricidad ("*Foro_IHA_Bucaramanga_Nov09.pdf*"), Fundacion Natura ("*Municipios CarbonoCero - Una estrategia innovadora.pdf*") and PricewaterhouseCoopers ("*PwC Presentacion Foro Bucaramanga - Nov 13 2009.pdf*"); * Pictures of the Forum held on Bucaramanga, on 13/11/2009.	Several dates listed after the file name.	PP
/25/	Colombia DNA	Outlook delivery receipt of the email sent to Colombia DNA, dated 02/10/2009 ("*Envio de Comunicacion 17172749_09. outlook item*") and Isagen letter number 17172749 sent to the Colombia DNA with the template provided in the EB 48, annex 62 fulfilled, dated 01/10/2009 ("*Carta de Notificacion DNA - 17172749_09.tiff*").	dated 02/10/2009	Other
/26/	Colombia Congress	Law nº 1111, dated 27/12/2006 for the income tax ("*LEY_1111 de 2006 - Tarifa del Impuesto de Renta.pdf*").	dated 27/12/2006	Other

/27/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Spreadsheet calculations of the Benchmark of the electric sector ("*Benchmark calculation .xlsx*"),.	dated 10/06/2011	PP
/28/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Support documents to the benchmark calculation: * U.S. treasure: Daily treasure Yield Curve Rates ("1 Risk free rate U.S Yield Curve.pdf"), dated 20/08/2010; * Spreadsheet with country risk premium EMBI, data from 1999 to 2008. Data obtained from the Central Bank of Peru (no date available in the spreadsheet) ("2 Country Risk Premium EMBI+ Colombia 1999 a 2008.xls"); * Comisión Nacional de Television presentation with country risk premium CNTV, dated 18/11/2008 (2.2 Country Risk Premium CNTV.pdf"); * PricewaterhouseCoopers Asesores Gerenciales Ltda Graphic of the country risk premium EMBI (no date available) ("2.3 EMBI Colombia gráfico.tif"); * PricewaterhouseCoopers Asesores Gerenciales Ltda Spreadsheet market risk premium (no date available) (3 Market Risk Premium Historical returns.xlsx"); * Cost of Capital 2008 Yearbook Document Statistic for SIC code 411 for the levered Beta Ibbotson, dated June 2008("4 Levered Beta Ibbotson Statistics For SIC Code 4911 Electric Services q2_2008.pdf; * Ibbotson Associates, Damoradan Spreadsheet levered beta damodaran (no date available) ("4 1 Levered Beta Damodaran betas08.xls"); * Isagen Spreadsheet with the long term inflation USA and Colombia (no date available) (5 Long Term inflation USA & COL.xls).	Several dates listed after the file name.	PP
/29/	Colombia Congress	Law nº 99 that establishes the Environmental Ministry, reordering the Public Sector in charge of managing and conserving the environment and renewable natural resources, organizes the National Environmental System- SINA- and gives other provisions.	dated 22/12/1993	Other
/30/	ISAGEN	Spreadsheet with data for the Operational and Management costs *(no date available)* ("*13. AOM - Sogamoso.xls*").	No date available	PP
/31/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Sensitivity analysis spreadsheet *(no date available)* ("*Proyecto Sogamoso - Análisis de Sensibilidad TIR.xlsx*").	No date available	PP
/32/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Energy prices estimative spreadsheet *(no date available) ("2.1. Análisis UPME 2008-2022.xls")*.	No date available	PP
/33/	CDM Executive Board	web site status of ratification available available at < http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php Available in English.	accessed on 09/09/2010	UNFCCC
/34/	CDM	UNFCCC web site, prior CDM consideration	accessed on 09/09/2010.	UNFCC

	Executive Board	available at <http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html		C
/35/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Spreadsheet with operational lifetime research of hydropower plants using data from the Colombian National Dispatch Center (no date available) ("3. Proyectos Hidroeléctricos - Año de Entrada en Operacion C.xls").	No date available	PP
/36/	Ministerio de Ambiente, Vivienda y Desarrollo territorial (Colômbia National Environmental Agency)	Resolution 1497 of 2009, article 1 (page 115),	dated 31/07/2009.	PP
/37/	CDM Executive Board	"Guidelines on the assessment of investment analysis"	Version 06 dated 24/07/2015 version 05, dated 15/07/2011	UNFCCC
/38/	Ministerio de Minas y Energia (Ministry of Mines & Energy):	* CREG: Resolution # 025, dated 19/07/1995 (Spanish) – SIN Operating regulation. * Resolution # 180195, dated 12/02/2009 (Spanish) – Technical Regulation of the Electric Installations (Reglamento Técnico de Instalaciones Eléctricas).	dated 19/07/1995 dated 12/02/2009	Other
/39/	CND-XM	CND-XM: Description of the Colombian Power System (Grid delineation/definition), available at <http://www.xm.com.co/Pages/DescripciondelSistemaElectricoColombiano.aspx	>, accessed on 09/09/2010 (English).	UNFCCC
/40/	CDM Executive Board	CDM-MOC-FORM - Modalities of communication statement	Version 02.3, dated 22/05/2015 Version 02.1, dated 16/03/2012	UNFCCC
/41/	CDM Executive Board	"Guidelines for the reporting and validation of Plant load factors."	Version 01, dated 17/07/2009	UNFCCC
/42/	Academia Colombiana de Ciencias Exactas, Físicas y Naturales (*Colombian Academy of Exact, Physical and Natural Sciences*) / UPME	FECOC - Factores de Emisión de los Combustibles Colombianos (*Emission factors of Colombian fuels) emission factor of Colombian fuels*), dated July 2003, available at <http://www.siame.gov.co/siame/documentos/documentacion/mdl/HTML/18_FECOC.htm#_Toc45099812>,	accessed on 09/09/2010.	Other
43/	CDM Executive Board	PDD form	version 4.1, dated 11/04/2012.	UNFCCC
/44/	CDM Executive Board	Clean Development Mechanism Project Cycle Procedure	Version 9 of 20/02/2015 version 04.0 of 29/07/2013	UNFCCC
/45/	CDM Executive	Clean Development Mechanism Project Standard	Version 9 of 20/02/2015 version 04.0, dated	UNFCCC

	Board		29/07/2013	
/46/	AENOR (Asociación Española de Normalización y Certificación - *Spanish Association of Standardization and Certification*) / PricewaterhouseCoopers Asesores Gerenciales Ltda	Contract to validate the Sogamoso Hydroelectric Project as per World Commission on Dams (WCD) requirements,	dated 15/06/2012.	Other
/47/	Google Earth computer program:	Geographical coordinates of the Sogamoso project.		Other
/48/	Ministry of Environmental and Sustainable Development of Colombia	Letter of approval	dated 02/10/2013	Other
/49/	ISAGEN	E-mail from DNA communicating the obtaining of LoA.	Dated 29/04/2014	PP
/49/	Ingetec S.A.	Sogamoso Hydrolectric Project- Basic Design of Dam, Annex civil works and associated equipments	dated 31/10/2006;	PP
/50/	Integral Engineering consultant	Optimization study of dam high and installed capacity, (annexs C and B);	dated March, 2008	PP
/51/	Ingetec S.A.	Preliminary budget of Basic Design of Sogamoso Project	dated 21/04/2008	PP
/52/	ISAGEN S.A.	spreadsheet with data applied on investment analiys “Documento Soporte del Presupuesto - Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xls,”,	dated 06/03/2015	PP
/53/	PricewaterhouseCoopers Asesores Gerenciales Ltda	*Annex 9 CL 5 Manual_Procedimientos_2007.2_Nov2008_Depreciacion Contable.pdf”* of the General Accounting Office,	Dated nov 2008	PP
/54/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Ley 56/81, Capitulo II , Articulo 4		PP
/55/	Rina Colombia Servios Técnicos Ltda. *&* PricewaterhouseCoopers Asesores Gerenciales Ltda	Professional Services Agreement.	dated 06/05/2010	PP

/56/	Isagem Energia Productiva	Notarised letter from Company's legal representative regarding MoC Authorised Signatory,.	Dated 28/05/2015	PP
/57/	Camara de Comercio de Medellin para Antioquia (Medellin for Antioquia Comercial Chambers)	Isagen S.A. E.S.P. Certificate of Existence and Representation	Dated 27/02/2015.	PP
/58/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Notarised letter from Company's legal representative regarding MoC Authorised Signatory,	Dated 11/03/2015.	PP
/59/	Camara de Comercio de Bogotá (Bogotá Comercial Chamber) - PricewaterhouseCoopers Asesores Gerenciales Ltda	Certificate of Existence and Representation,	Dated 27/02/2015.	Other
/60/	Codigo de Comercio de Colombia (Colombia Trading Code)	Decree 410 of 1971, Article 86. http://www.ccb.org.co/Tramites-y-Consultas/Certificados-que-expide-la-CCB		Other
/61/	Ministerio de Minas y Energía	Unidad de Planeación Minero Energética (UPME), April 2008: PLAN DE EXPANSIÓN DE REFERENCIA GENERACIÓN • TRANSMISIÓN 2008 – 2022.pdf (Ministry of Mines and Energy – Department of Mining and Energy Planning).	April 2008	Other
/62/	Ministerio de Minas y Energía	Resolution n#025 of 13/07/1995 and Resolution 038 of 20/03/2014 (Annex 10 Cr025-95.pdf and Annex 11 ResCREG 038_2014 Codigo de Medida.pdf respectively).	Resolution 025 13/07/1995 and Resolution 038 of 20/03/2014	Other
/63/	Ingetec S.A.	: Hydrological Series – Sogamoso Project (from the Spanish: Series Hidrologicas - Proyecto Sogamoso)	Dated 14.03.2008	PP
/64/	CDM Executive Board	Methodological tool: Common practice	Version 03.1 of 03/06/2015	Other
/65/	PricewaterhouseCoopers Asesores Gerenciales Ltda	Annex 8 - 14 Common practice back up calculations.xlsx dated 13/08/2015 – sourced from http://paratec.xm.com.co/paratec/SitePages/generacion.aspx?q=capacidad	Dated 13/08/2015	PP

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	1	**Section no.**	E.1.5	**Date:** 12/03/2014
Description of CL				
In the PDD version 1 it is mentioned that "Sogamoso Hydroelectric Project, owned by ISAGEN which is an environmentally and socially responsible Company, complies and incorporates strategic principles, criteria and guidelines established by the World Commission on Dams about policies and corporate expressions of social responsibility". PP shall clarify or provide evidences of the compliance with WCD criteria's.				
Project participant response				**Date:** 12/03/2014
In response to CL 1 of the assessment for validation, in the new version of the PDD it is not mentioned that the Sogamoso hydroelectric project incorporates and complies with the strategic principles, criteria and guidelines set by the World Commission on Dams. In the new version of the PDD it only is mentioned that the Sogamoso Hydroelectric Project follows and incorporates the strategic principles, criteria and guidelines set by the World Commission on Dams. With respect to how the Sogamoso Hydroelectric Project follows and incorporates such aspects, as *"Annex 7"*, in the folder Principos estrategicos DAMS - Sogamoso, which is attached to this responses table, it is explained how Sogamoso Project follows and incorporates each of the strategic principles, criteria and guidelines established by the World Commission on Dams and indicates the documents that demonstrate the incorporation of these aspects, which correspond to files which are also located in the folder Principos estrategicos DAMS - Sogamoso. **Second response:** Sogamoso Hydroelectric project is in process to obtain, from the The Spanish Association of Standardization and Certification, the Official Validation for the Compliance of strategic principles, criteria and guidelines established by the World Commission on Dams. The change can be seen in the PDD version 3 attached to this table of responses. The signed contract with The Spanish Association of Standardization and Certification is also attached to this table of responses. **PP's third response:** According to the CL 1 remaining open, PP's have attached to this table of responses the signed contract with the Spanish Association of Standardization and Certification for the validation of the strategic principles, criteria and guidelines according to the World Commission on Dams.				
Documentation provided by project participant				
Spanish Association of Standardization and Certification for the validation of the strategic principles, criteria and guidelines according to the World Commission on Dams.				
DOE assessment				**Date:** 12/03/2014

The strategic principles, criteria and guidelines set by the World Commission on Dams are not part of the validation scope.

PP has presented in "Annex 7" evidences that shows that Sogamoso hydroelectric project follows some principles of the WCD. However, as it is not part of the validation scope, it is not possible to confirm that Sogamoso Hydroelectric Project follows and incorporates each the strategic principles, criteria and guidelines set by the World Commission on Dams.

This CL remains open.

Second response:

PPs clarified that Sogamoso is in the process of validation according to the World Commission on Dams strategic principles, criteria and guidelines. Nevertheless, the signed contract with the Spanish Association of Standardization and Certification (AENOR) was not provided yet.

This CL remains open.

Third response

AENOR contract dated 15/06/2012 was provided /46/.

This CL is closed.

CL ID	2	**Section no.**	B.4.1	**Date:** 12/03/2014
Description of CL				
As per the applied methodology (ACM0002), as the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is already defined and therefore there is no need to identify alternative scenarios. PP is requested to revise PDD accordingly.				
Project participant response				**Date:** 17/10/2014
Project participants agree with that mentioned in CL 2; therefore, the relevant revisions were made.				
Documentation provided by project participant				
Revised PDD.				
DOE assessment				**Date:** 12/03/2014
The baseline presented in the PDD version 2 is according to the one defined in the ACM0003, version 12.1.0: *Delivered electricity to the grid by the project activity that would have otherwise been generated by the operation of power plants connected to the grid and the additions of new power plants, as reflected in the calculation of the combined margin in the "Tool to calculate the emission factor for an electricity system".* This CL is closed.				

CL ID	3	**Section no.**	B.5.3.2	**Date:** 12/03/2014
Description of CL				
In order to be in line with the evidences provided for the CDM consideration, PP shall update the following information in the PDD: the email sent to the Colombia DNA is dated 02/10/2009 and, as per the UNFCCC web site, the notification was received on 16/10/2009.				
Project participant response				**Date:** 17/10/2014
In response to CL 3 of the assessment for validation, the dates of dispatch and receipt of the notification to the UNFCCC was clearly indicated in the new version of the PDD.				
Documentation provided by project participant				
Revised PDD.				
DOE assessment				**Date:** 12/03/2014
PDD version 2 was revised accordingly and is coherent with the evidences presented. This CL is closed.				

CL ID	4	**Section no.**	B.5.4.2	**Date:** 12/03/2014
Description of CL				
Project participants should clarify if it is considered in the Project Sogamoso the investment financing from third parties and what is the equity/debt proportion of the project. If the financing is being considered in the project, project participants should revise the financial analysis and/or the benchmark analysis to adequate it to the paragraph 12 of the latest "Guidelines on the assessment of investment analysis" version (/37/): *"…benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented*".				

Project participant response	Date: 12/03/2014

In response to CL 4 of the assessment for validation, the financial model presented considers implementation of the project without financing, because that was the way the project was evaluated by Isagen and that was the way Isagen decided to implement the project. According to the Guidance of the Methodological Tool version 5.2, required in the Step 2, in its annex in the numeral 6 page 13 is mentioned: "Guidance: Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant." As it can be seen, considering implementation of the project without financing corresponds to the way Isagen decided to implement the project and is consistent with the requirement of the Guidance of the Methodological Tool.

The project started its implementation with Isagen's own resources as explained below: the construction of access roads started on February 23, 2009 and the specifications for the construction of diversion tunnels were available since November 25, 2008 for a public tender which was closed on February 13, 2009. These events were previous to the authorization from the Ministry of Finance and Public Credit to Isagen for accessing to public credit, which was issued on August 20, 2009. It is important to say that the Ministry would have been able to deny the credit authorization (nonetheless the project could have continued its implementation with the Isagen´s equity sole, as was considered at the beginning of the Project). Furthermore, the starting date of the project (date on which the first basic construction of the Project was initiated), indicated in the PDD version 1 as August 5, 2009, is also previous to that authorization, which shows that the decision to initiate the project was previous to the authorization from the Ministry.

Evidence of the date of publication of specifications for the construction of diversion tunnels can be seen in the file of newspaper reports attached to this table of responses in the folder *"Annex 8 CL 4 No financing"*. Similarly, evidence of authorization from the Ministry of Finance and Public Credit is shown in the Resolution 2258 of August 20, 2009 of the Ministry of Finance and Public Credit, also attached in the mentioned folder.

Additionally, the numeral 9 page 14 of the Methodological Tool mentions: "Guidance: The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of the project IRR." This is totally consistent with the IRR calculation made in the financial model of the project (made by Isagen and presented to DOE) because the cost of financing expenditure is not considered in the IRR calculation, which is consistent with the way the project was evaluated and decided to be implemented by Isagen and is consistent with the Guidance of the Methodological Tool.

According to mentioned above, and taking into account that the project did not have financing, likewise the benchmark was made without considering debt.

Documentation provided by project participant
Annex 8 CL 4 No financing". Similarly, evidence of authorization from the Ministry of Finance and Public Credit is shown in the Resolution 2258 of August 20, 2009 of the Ministry of Finance and Public Credit

DOE assessment	Date: 12/03/2014

Project participants properly clarified the question about investment financing from third parts and justify that the possibility to third part financing occurred after the project starting date. **This CL 4 is closed.**

CL ID	5	Section no.	B.5.4.3	Date: 12/03/2014

Description of CL

The depreciation was taken into account, however the depreciation system applied is not clear. Project participants shall clarify the chosen depreciation system, including the distinction between "tax depreciation" and "accounting depreciation", the depreciation periods and justify the reason to apply in the income tax calculations just the difference between "fiscal depreciation" and "accounting depreciation". Official sources from local institutions or government about depreciation system in Colombia should be provided.

Project participant response	Date: 12/03/2014

The system of Accounting Depreciation System used in Colombia is *straight line*, which is regulated by the numeral 6 and 10 of Chapter III of the *"Annex 9 CL 5 Manual_Procedimientos_2007.2_Nov2008_Depreciacion Contable.pdf"* of the General Accounting Office, which is attached to this table of responses. It defines the lifetime of 50 years for civil constructions, 25 years for equipment and 5 years for other assets. For tax purposes the company applies accelerated depreciation regulated by Article 2 of Decree 3019 of 1989, which provides 20 years of lifetime for civil constructions, 10 years for equipment and 5 years for other assets. Depreciation established for the calculation of free cash flow includes two values for depreciation, the first value is the accounting depreciation and the second value is the additional tax depreciation taken. The sum of the two values is the total depreciation for tax purposes and therefore the basis for the current tax calculation.

Second response:

The “Other Assets” item was not included in the depreciation calculation because this item corresponds to the Replacement Works of the Project, which will be given by Isagen to the corresponding entities that are in charge of administration of each Work to be replaced. For instance, one kind of the assets included in the “Other Assets” corresponds to the roads that will be flooded by the future reservoir; these roads are not and will not be owned by Isagen because they are and will keep being owned by the respective current public entity in charge of this kind of assets in the department of Santander, which are entities attached to the local or national government, depending on the specific asset.

Therefore, these assets will not be owned by Isagen, hence there is no reason to include the “Other Assets” in the depreciation calculation because they are not part of the Project’s accounting system.

Documentation provided by project participant

The *“Annex 9 CL 5 Manual_Procedimientos_2007.2_Nov2008_Depreciacion Contable.pdf”* of the General Accounting.

DOE assessment	**Date:** 12/03/2014

Project participants properly clarified the depreciation system in Colombia. The P&L is calculated with the accounting depreciation and for the Income Tax calculation the EBIT is adjusted with the difference between Fiscal and Accounting depreciation.

Project participants should justify the reason to not include in the calculations the “Other Assets” depreciation.

This CL remains open.

Second response:

PPs clarified that the “Other Assets” items are related to assets that will not be owned by ISAGEN and therefore are not be included in the depreciation calculation.

CL is closed.

CL ID	6	**Section no.**	B.5	**Date:** 12/03/2014

Description of CL

There is a salvage value in the end of the cash flow, however this salvage value was not calculated taken into account the depreciation and the return of the working capital, it is a calculation with the last year cash flow and a cost of capital value. Project participants shall justify the salvage value calculations. According to the EB 51 – Guidelines on the assessment of the investment “It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets”

Project participant response	**Date:** 12/03/2014

The concept of "Terminal Value" considered in the financial model does not correspond to a salvage value.

The concept of "Terminal Value" corresponds to the net present value of future cash flows considered in perpetuity after year 20 of operation, calculated with a discount rate, which in this case is the rate of equity (in the financial model listed as "Cost of equity - nominal COP") defined for the project.

For this hydroelectric project it does not apply the concept of salvage value, because the expected lifetime of assets is much greater than the lifetime established for accounting and tax purposes

Documentation provided by project participant

Cash Flow Spreadsheet.

DOE assessment	**Date:** 12/03/2014

Project participants clarified the calculations of “terminal value” at the end of the cash flow.

This CL is closed

CL ID	7	**Section no.**	B.5.4	**Date:** 12/03/2014

Description of CL

Project participants provided the annex “2.1. Análisis UPME 2008-2022.xls” /32/ with an estimative of electricity price in Colombia from 2008 until 2022, however it is not evidenced the values used in the financial analysis. Project participants shall indicate in the annex “2.1. Análisis UPME 2008-2022.xls” where are the values used in the financial analysis calculations and should demonstrate the sources of the data used in this estimative. Furthermore, PP is requested to explain the electricity price value of 46.91 USD/MWh (2008) presented in the annex “2.1. Análisis UPME 2008-2022.xls” /32/ while the published PDD mentions (Table 5) a value of 46.92 USD/MWh (2008).

Project participant response	**Date:** 12/03/2014

The financial model took into account the prices of the *"Annex 10 CL 7 Analisis UPME 2008-2022(English).xls" (attached to this table) in the sheet "Proy. Met. 1"* in the column highlighted in yellow. It is important to note that the MSExcel model performs decimal approximations. Regarding the question related to the electricity price, approximate values were used in the PDD and the value of 42.91 was used in the MSExcel file. The values of file *"Annex 10 CL 7 Analisis UPME 2008-2022(English).xls"* agree exactly to the new version of the PDD.
Documentation provided by project participant
Annex 10 CL 7 Analisis UPME 2008-2022(English).xls"
DOE assessment **Date:** 12/03/2014
Project participants clarified the submission of electricity prices. There is in all years a short, and not relevant, deviation from evidence document to Financial Analysis values. **This CL is closed.**

CL ID	8	**Section no.**	B.5.4	**Date:** 12/03/2014
Description of CL				
In the IRR spreadsheet, there is a worksheet "Ingresos" with all revenues of project Sogamoso. There are seven different revenues lines (CIF, Regulado, Ventas Bolsa, Cargo Confiabilidad, Ventas AGC and Transacciones Forzadas). Project participants shall clarify the characteristics of each revenue line in the worksheet "Ingresos", summarizing how is calculated/estimated the price, what is the proportion in the electricity generation and if is based in contracts, auctions, free negotiations, etc. All evidences about calculated/estimated revenues shall be provided.				
Project participant response				**Date:** 12/03/2014
CIF: (FIC – Final Industrial Client). This acronym stands for *Final Industrial Client*. This type of revenue indicates the income received from the power sales to industrial clients. *Regulado*: (Regulated) This concept refers to revenues from *Regulated Users*. *Regulated Users* are defined in Colombian electric regulation (Resolution CREG 131/98 and others) as users whose power demand does not exceed established specific limits, which does not permit liberty in power negotiations between *Regulated Users* and power suppliers. *Ventas bolsa*: (Spot sales) This concept refers to revenues from *Spot Sales* into the Wholesale Electricity Market. *Spot Market* (into the Wholesale Electricity Market) refers to the system where generators and power traders perform transactions of supply and demand power exchange, hour by hour. (Resolution CREG 024/95 is the document that supports this concept) *Cargo Confiabilidad*: (Reliability Charge) This concept refers to remunerations to generators which are committed to deliver *Firm Power* to the grid during critic conditions of power supply into the Colombian electric system. (Resolution CREG 071/06 is the document that supports this concept) *Ventas AGC*: (AGC Sales) This concept refers to one type of power generation associated services. These services are performed by generation Companies in order to assure the compliance with quality, reliability and security standards about electricity supply. AGC stands for *Automatic Generation Control*. (Resolution CREG 024/95 is the document that supports this concept) *Transacciones Forzadas*: (Forced Transactions) This concept refers to income from sales of forced generation required because of electric restrictions into the National Interconnected System. (Resolution CREG 062/00 is the document that supports this concept) Resolutions mentioned in this response are attached to this table in the folder *"Annex 11 CL 8 spreadsheet income"*. **Second response:** In response to the CL 8 remaining open, please find attached to this table of responses the historical data of energy prices in Colombia obtained from the database "Neon" of the XM, which is the official entity in charge of the technical and commercial administration of the Wholesale Electricity Market in Colombia. Nonetheless, this information is publicly available and can be downloaded from the following link: http://sv04.xm.com.co/neonweb/.				
Documentation provided by project participant				
Energy prices (monthly averages) historical data from Neon database (XM Compañia de Expertos en Mercados S.A. ESP. - *Colombian National Dispatch Center*)				
DOE assessment				**Date:** 12/03/2014

Project participants clarified all kinds of income in the project and provided the documentation about these kinds of contracts.

Energy prices (monthly averages) historical data from Neon database (XM Compañia de Expertos en Mercados S.A. ESP. - *Colombian National Dispatch Center*) was provided and is available at http://sv04.xm.com.co/neonweb/. Sogamoso energy price projections are based in the 2008-2022 Expansion plan from the Unidad de Planeación Minero Energética (*Energetic Mining Planning Unit* - Ministry of Mines & Energy) and are more conservative (higher) than the average of 2007-2006-2005 Neon database.

This CL is closed

CL ID	9	**Section no.**	B.5.4	**Date:** 12/03/2014
Description of CL				
In the Financial Analysis project participants are considering a total amount of Costs and Expenses that are about 45% of the yearly total revenues. Almost all lines of Costs are about Taxes and Tariff over the electricity generation. Project participants provided some documents (as the law 99 /29/ and spreadsheet "O&M Costs" /30/) but there are no evidences or is difficult to identify and to check the related document for some lines (for instance: Capacity Charge, Final CFI, Law 99, FAZNI, CND-ASIC, CREG-SSPD, Insurance and Land Taxes) and to validate the applied value in the financial analysis with the number presented in the document (it is difficult to cross check the values used in the financial analysis). Project participants shall provide the evidences for all relevant costs, expenses and taxes (including an explanation about the application of taxes other than income tax and depreciation) and shall present in the financial analysis a note with the name of the document and if necessary a note about the applied value/s				
Project participant response				**Date:** 12/03/2014

In response to CL 9 of the assessment for validation, in order to explain all relevant costs and expenses of the sheet "Assumptions" of the Financial Model presented to DOE, definitions and documents related to those costs and expenses are indicated below:

Capacity (Reliability) Charge: It is regulated by the Resolution CREG 071, 2006, which was sent to Rina in the file *10. Creg071-2006 - INTEGRADA_Abril 23 de 2008.pdf*, which presents the methodology for calculating the value of reliability charge.

Final CFI: Power price to Final Industrial Clients (CFI per the initials in Spanish of Cliente(s) Final(es) Industrial(es)) includes following charges: i) Generation, ii) Transmission (charges STN and STR), iii) Commercialization, iv) Distribution (charges SDL) and v) Other Charges (charges CND, ASIC, CREG and SSPD).

All charges above are invoiced by Isagen to CFI, but Generation and Commercialization charges are the only charges that represent income to Isagen and they are indicated as *Final CFI* in the financial model presented to DOE, The other charges do not represent income or debit for Isagen because they are transferred to the Administrator of the Wholesale Electricity Market.

Therefore, the item *Final CFI* of the financial model corresponds to the income from power sales to final industrial clients, which comprise Generation and Commercialization charges that are a part of the charges invoiced to those clients according to the Resolutions CREG 054/94, 031/97 and 131/98.

The other charges of the financial model (as income or as a debit) are equal to zero because Isagen only invoices those charges to its clients and transfers to the Administrator of the Wholesale Electricity Market the money corresponding to STN, STR and SDL charges, and Other Charges (CND, ASIC, CREG and SSPD).

These charges are explained below:

STN: Charge for use of the National Transmission System (STN per the initials in Spanish of *Sistema de Transmisión Nacional*)

STR: Charge for use of Regional Transmission Systems (STR per the initials in Spanish of *Sistema de Transmisión Regional*)

SDL: Charge for use of Local Distribution Systems (SDL per the initials in Spanish of *Sistema de Distribución Local*)

CND: Charge for the services of the National Dispatch Center (CND per the initials in Spanish of *Centro Nacional de Despacho*)

ASIC: Charge for the services of the Administrator of Commercial Exchanges System (ASIC per the initials in Spanish of *Administrador del Sistema de Intercambios Comerciales*)

CREG: Charge for the services of the Regulation Commission of Energy and Gas (CREG per the initials in Spanish of *Comisión de Regulación de Energía y Gas*)

SSPD: Charge for the services of Superintendency of Public Utilities (SSPD per the initials in Spanish of *Superintendencia de Servicios Publicos Domiciliarios*)

These charges are regulated by Resolutions CREG 02/1994 (for STN charges), 031/1997 and 244/1997 (for all charges), and 82/2002 (for STR and SDL charges).

The Resolution 02/94 indicates the way the STN charge is distributed among network's owners. In the Resolution 131/98 is indicated that commercializators have the payment obligation of STR and SDL charges. In the Resolution 82/02, liquidation and collecting procedures are indicated, likewise, it is indicated that commercializators must invoice charges to their clients in order to remunerate Network's Operators.

Resolutions mentioned for this concept are attached to this table in the folder *"Annex 12 CL 9 charges"*.

Law 99: View file *11. Ley 99 de 1993.pdf* in its Article 45: Transfer of power sector which gives the methodology for calculating transfers of the generating plants to the municipalities and the Regional Autonomous Corporations (CAR).

FAZNI: See file *8. Ley_633_2000.pdf* in its Article 81 and file *12. Ley 1099 de 2006.pdf* in its Article 1 which extended its application until December 2014.

CND ASIC Costs: See file *Creg110-2006.pdf*. Through which sets the revenues regulated by the National Dispatch Center (CND) and Manager of Commercial Exchanges (ASIC). Each plant pays the cost of CND and the ASIC according to the percentage participation of installed capacity in the total installed capacity of the system.

Contributions to the Regulation Commission of Energy and Gas (CREG) and Superintendency of Public Utilities (SSPD): See file *5. Ley142 de1994-Contribuciones Creg y SSPD.pdf* in its Article 85 that establishes the amount to be transferred to the Superintendency and the CREG.

Insurance: See file *14. Tasas históricas de la póliza Daños Materiales.msg*

Land Taxes: See file *6. Ley_56_1981.pdf*, Chapter 2 Article 4.

Documentation provided by project participant

Several files listed above.

DOE assessment	Date: 12/03/2014
Project participants presented the details and descriptions of all Costs and Expenses. For the most relevant lines project participants presented documents with the methodology for calculations. **This CL is closed**	

CL ID	10	Section no.	B.5.4	Date: 12/03/2014
Description of CL				
The O&M Costs presented by project participants is about 3% of total revenues in the first operational year and about 1% in the last year of operation. Project participants shall explain the calculations to estimate the O&M costs (named in the financial analysis spreadsheet "AOM"), shall clarify the small participation of this important line in the total cost amount and shall justify the reason to index this spending to the USD instead of the local currency, which generates the lowest share of this spending in the end of the project life.				
Project participant response				**Date:** 12/03/2014
The calculation of AOM for the project is presented in the file *13. AOM - Sogamoso.xls*, this document calculates the cost of AOM, taking into account the AOM for the San Carlos and Miel I hydroelectric power plants. In the first year of operation, AOM costs represent 3% of income given that income for the first year covered only one month of operation. Likewise, AOM costs in the following years represent 1% of income because they are considered as income during the 12 months of the year. The AOM is calculated in dollars and then indexed to pesos since maintenance costs are calculated in dollars because the plant equipment is supplied by foreign companies who Isagen has to pay in dollars, and indexed because the financial model uses current Colombian pesos.				
Documentation provided by project participant				
13. AOM - Sogamoso.xls				
DOE assessment				**Date:** 12/03/2014
Project participants properly justified the O&M Costs in the Financial Analysis. **This CL is closed.**				

CL ID	11	Section no.	B.5.4	Date: 12/03/2014
Description of CL				
Project participants shall provide the composition of all these investment items with proper evidences (sources) to confirm the presented values.				
Project participant response				**Date:** 17/10/2014// 01/06/2015
Isagen has contracted the Ingetec Company* as a third party to perform the estimates of Investment Spending. These estimates have their support in the Therefore, the support of Investment Spending is the study performed by Ingetec, which has already been delivered to Rina, nonetheless the document that contains the details of the budget, prepared by Ingetec also, is attached to this table of responses and corresponds to the folder *"Annex 13 CL 11 budget details"*. *Company founded in 1947 and with more than 60 years experience, Ingetec SA participated in the development of major infrastructure projects in Colombia, and various engineering projects carried out in Argentina, Bolivia, Costa Rica, Canada, Chile, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Panama, Peru, Turkey and Venezuela. The firm has extensive experience in design, consultancy and supervision of hydroelectric and thermoelectric projects, transmission lines and substations, transportation and disposal of sewage, irrigation districts, roads (tunnels, bridges and viaducts), mass transport (metro, articulated buses), environmental and social studies, industrial developments, among others, leadership in the design of dams, tunnels, caverns and deep wells of large diameter.				
Documentation provided by project participant				
Annex 13 CL 11 budget details				
DOE assessment				**Date:** 12/03/2014
Project participants are being supported by a company with experience in this kind of project. The investment budget of the project was detailed by project participants and the contracted company. **This CL is closed**.				

CL ID	12	Section no.	B.5.4	Date: 12/03/2014
Description of CL				
Project participants shall provide in the financial analysis spreadsheet an easier way to reproduce the sensitivity analysis results presented in PDD.				
Project participant response				**Date:** 17/10/2014// 01/06/2015
The financial model allows to carry out sensitivities on the sheet "Assumptions" in the cell C62 for power generation, C86 for Energy Prices; in the sheet "InvDepTaxes" Cell C17 for the budget of Investments; and in the Sheet "Cost" cell C34 for the total costs. Once the values are changed in each of the cells specified above, the impact of these changes on the IRR can be seen on the sheet "Results" in the cell C37. Isagen will send the financial model (Annex 4) with the corresponding sensitivity sheet.				
Documentation provided by project participant				
financial analysis model				
DOE assessment				**Date:** 12/03/2014
Project participants adjusted the financial analysis model as requested. The sensitivity analysis could be reproduced and the results are aligned with PDD. **This CL is closed**.				

CL ID	13	Section no.	B.5.4	Date: 12/03/2014
Description of CL				
Since the 10% variation for all parameters didn't presented an IRR more favorable than the benchmark, it would be more useful to show how large should be these variations to make the project IRR equal the benchmark. Then a second analysis should be applied to discuss the likelihood of occurrence of these scenarios.				
Project participant response				**Date:** 17/10/2014// 01/06/2015
For the variable Power Generation: the IRR is reached when the variable is increased by 24%. It is not feasible to increase power generation by 24%, since there are technical limitations that prevent reaching that level of generation, such as the water flows available, the hydraulic head of the plant, and the design of the electromechanical equipment. Additionally, taking into account the historical water inputs in the place of project´s dam, it is not realistic that the water flow increases, therefore, the possibility of increase of power generation is virtually zero. - For the variable Power Price: the IRR is reached when the variable is increased by 15.8%. It is not feasible to reach this level, as explained and argued in the PDD version 1. Additionally, power price of the financial model corresponds to the greatest scenario of prices according to the Expansion Plan 2008-2022 by UPME which is an official study of the government used by electric sector Companies for their projections. Therefore, the possibility of increase of power prices is virtually zero. - For the variable Investment: the IRR is reached when the variable is decreased by 17.9%. It is not feasible to reach this level, as explained and argued in the PDD version 1. - For the variable Expenditures: the IRR is reached when the variable is decreased by 15%. It is not feasible to reach this level, as explained and argued in the PDD version 1.				
Documentation provided by project participant				
Revised PDD.				
DOE assessment				**Date:** 12/03/2014
Project participants provided an assessment of the probability of the occurrence of these scenarios. **This CL is closed**.				

CL ID	14	Section no.	B.6.1	Date: 12/03/2014
Description of CL				
During site visit, it was possible to check that the emission factor is calculated automatically by a program, using the information public available from Colombia National Dispatch Center (CND-XM) through the database Neon, and data from the Energy Mining Planning Unit (UMPE). Moreover, PP provided a spreadsheet with an example of calculation for 2 days ("*FE 2008 a Rina 22jun10.xlsx*"). However, for transparency, PP shall prepare a spreadsheet (reproducible) where it is possible to confirm all the emission factor data and calculations.				

Project participant response	**Date:** 12/03/2014
Project participants have prepared the calculation for emission factor of the electrical grid which is attached to this table of responses in the folder *"Annex 14 CL 14 EF calculation"*. **Second response:** In response to the CL14 remaining open, the revised procedures to determine the build margin presented in the tool version 2.2.0 and 2.2.1 do not affect the results presented in the emission factor spreadsheet because the initial calculations made by the Projects Participants agree with the steps included in the new version of the tool.is decreased by 15%. It is not feasible to reach this level, as explained and argued in the PDD version 1.	
Documentation provided by project participant	
"Annex 14 CL 14 EF calculation"	
DOE assessment	**Date:** 12/03/2014
PP is requested to clarify if the revised procedure to determine the build margin presented in the tool version 2.2.0 is taken into account in the emission factor spreadsheet calculations. This CL remains open. **Second response:** The changes in the new version of the tool, does not impact the calculus of the emission factor. **This CL is closed**.	

CL ID	15	**Section no.**	B.6.1	**Date:** 12/03/2014
Description of CL				
PP shall clarify (source) the formula used in the sub-step 4.2 of the calculation of the Grid emission factor presented in the PDD version 1. The presented formula is not mentioned in the "Tool to calculate the emission factor for an electricity system" /7/. Moreover, the latest version of the referred Tool shall be applied in EF calculations and spreadsheet/s and published PDD shall be revised accordingly, as per Tool steps.				
Project participant response				**Date:** 12/03/2014
The PDD was updated to make clear about the requirements of CL 15 of the assessment for validation. Calculation of the Grid Emission Factor was updated as shown in the *"Annex 15 CL15 PDD Sog draft EF for V2.docx"*, which is attached to this table of responses. This was revised taking into account the version 2.2.0 of the tool.				
Documentation provided by project participant				
Revised PDD				
DOE assessment				**Date:** 12/03/2014
As per PP response, the PDD version 2 was revised, considering the available version 2.2.0 of the tool. However, PDD still mentions version 2, instead of version 2.2.0 As per the tool, the OM data vintage should be presented in the step 3 and PP has presented it in the step 4. It is not presented in the step 4, how the CO_2 emission factor of the grid power units *n* ($FE_{EL,n,y}$) is determined. As per the tool, it "*should be determined as per the guidance for the simple OM, using the Options A1, A2 or A3*". In the step 5, PP has not presented the complete description of data vintage chosen (option 2). Moreover, the sample group of power units *m* used to calculate the build margin is not presented as per the procedure of the tool. PP did not consider the correct steps numbers and names of the tool version 2.2.0 (for example, PDD mention "STEP 6 Calculation of the build margin emission factor"; tool: "Step 6: Calculate the combined margin emissions factor", in the tool there is no "step 4.1" and "step 4.2", amongst others). This CL remains open. **Second response:** The PDD version 3 was revised accordingly. **This CL is closed**.				

CL ID	16	**Section no.**	D.1.2	**Date:** 12/03/2014
Description of CL				
The PDD version 1 describes the environmental impacts and its monitoring, compensation or restoration activity. PP shall specify/ make clear in the PDD the programs that are additional to the ones required by the environmental agency.				
Project participant response				**Date:** 17/10/2014

In the new version of the PDD, in the section A.2, it was detailed the actions and programs that are voluntary and additional to those required by the environmental authorities. These actions and programs are:

- Agreement with the Hospital San Juan de Dios, municipality of Betulia, to the adequacy and equipping of the Health Center, located in the area of Tienda Nueva, in order to improve the care for the population sectors adjacent to the Project site.
- Under the agreement with the Hospital, the Health Brigades will permit medical and dental care to various sectors and villages in the area of influence.
- Agreement with National Library for construction of public library in Tienda Nueva, connected to the National Network of Libraries, which includes cultural programming and the mobile library service, in order to expand services to the villages.
- Economical support for the School Nuestra Señora de La Paz, for the betterment of furniture, teaching material and educational facilities; and support to the student group 'Reciclando Vida'
- Diagnosis of water supply and sewage systems in the populated areas surrounding in the Project´s zone, and the design of these systems in Tienda Nueva, La Playa y El Peaje
- Design of the aqueduct system in the municipalities of Betulia and Zapatoca.
- Contracts of Consortium with Centro de Estudios Regionales and Universidad Autónoma de Bucaramanga for the conformation of the employment table for the communities of local and regional influence area of the Project.
- Creation of the employment follow up committee
- Creation of the employment management office
- Training and promotion of local staff to leave an installed capacity of skilled labor in the region
- Monitoring of climatological and agriculture-economic behavior of the Project area
- Support to events for the community
- Construction of civil works to improve community safety
- Construction of facilities for the operation of the Center for Citizen Coexistence

Additionally in the new version of the PDD, the following voluntary actions or programs was included:

- Development and Peace Program Agreement in Magdalena Medio (PDPMM), Diocese of Barrancabermeja and UNFPA for psychological attention and reproductive and sexual health.
- Training sessions with the support of the Consortium of Centro de Estudios Regionales and Universidad Autónoma de Bucaramanga for training or education for workers of the local communities with the purpose to improve their skills to comply properly with their functions in the operation of the Project
- Construction of the Police Station for Tienda Nueva and surrounding areas

Support in adaptation of the aqueduct in the township of El Llanito, Barrancabermeja

Documentation provided by project participant

Revised PDD

DOE assessment	**Date:** 12/03/2014

PP has revised the PDD in order to make transparent the compulsory programs and the voluntaries one.

The environmental agency is responsible to check the compulsory programs.

This CL is closed.

CL ID	17	**Section no.**	D.1.3	**Date:** 12/03/2014

Description of CL

PP shall provide the applicable semi-annual environmental reports presented to the environmental agency, as per the requirements of the Environmental Management Plan /16/.

Project participant response	**Date:** 12/03/2014

In response to CL 17 of the assessment for validation, Project Participants attach the requested documents with this table of responses, as *"Annex 16"*, in the folder *ICA-01-ISAGEN-49-2989-2009* and in the folder *ICA N° 1- PHS-OBRAS PRINCIPALES.* Environmental Compliance Report #1 is presented to Rina both for Access Roads Works and Main Works.

Environmental Compliance Report #1 for Access Roads Works corresponds to the period March-August, 2009, according to the Resolution 206 of 2009 of Ministry of Environment, Housing and Territorial Development (MAVDT). Environmental Compliance Report #1 for Main Works corresponds to the period September 2009 – June 2010, according to the Resolution 1497 and 2329 of 2009 of Ministry of Environment, Housing and Territorial Development (MAVDT).

Access Roads Works were required to submit the Environmental Compliance Report #2 as a Final Report to the environmental authority, which was submitted as a part of the Environmental Compliance Report #1 of Main Works, according to that provided in the environmental license of the Project.

Documentation provided by project participant

Access Roads works ("*ICA-01- ISAGEN-46-2989-2009.pdf*") and the report for the Main Works ("*Texto Primer ICA Obras Principales.pdf*").

DOE assessment	**Date:** 12/03/2014

PP has provided the report for the Access Roads works ("*ICA-01- ISAGEN-46-2989-2009.pdf*") and the report for the Main Works ("*Texto Primer ICA Obras Principales.pdf*").

This CL is closed.

CL ID	18	**Section no.**	A.4.2	**Date:** 12/03/2014

Description of CL

PP is requested to clearly address in the PDD if the technology to be used will result in a significantly better performance than any commonly used technologies in the host Country and if there is any transfer of technology from any Annex I Party involved.

Project participant response	**Date:** 12/03/2014

In response to CL 17, these aspects were included in the new version of the PDD, in the section A.4.3.: Technology to be employed by the project activity.

Documentation provided by project participant

Revised PDD

DOE assessment	**Date:** 12/03/2014

PDD version 2 was revised to include the description Technology Transfer that will be provided in the project activity. Equipments will be provided by specialized companies from Annex 1 countries.

This CL is closed.

Table 2. CAR from this validation

CAR ID	1	**Section no.**	A.2.1	**Date:** 12/03/2014
Description of CAR				
As per the PDD version 1, the project activity consists of the installation of a new hydropower plant with installed capacity of 820 MW. However, as per the information presented in the section A.4.3, confirmed through the generators specifications ("CC Cap 2-Parte II-5-418.pdf"), the total installed capacity of the project activity is 874.8 MW (3 generators of 324 MVA, power factor of 0.9). Moreover, as per the Power plant's design documentation: Ingetec S.A., Update of designs of tender and environmental impact study - Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, rev. 1 - June 9, 2008 /21/, the average energy generation of 5,056 GWh per year is based on an installed capacity of 870 MW. It is requested to PP to revise the installed capacity of the project activity as per the definitions of the applied methodology ACM0002: "*The installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units*".				
Project participant response				**Date:** 12/03/2014
In the document *Ingetec S.A.* Update of designs of tender and Environmental Impact Study for Sogamoso Hydroelectric Project Recommendations of installation for the Power Plant, revision 1 - June 9, 2008,* a review was made of the installed capacity of the power plant through a technical-economic analysis with different alternatives of water flow and hydraulic head, therefore the results for the different options discussed were presented in that document. The selected option corresponds to the alternative 2, which corresponds to a maximum generation capacity of 290 MW per unit, that is, 870 MW in total for the three units. In this way, the Nameplate of each generator given by the manufacturer is 324 MVA and power factor of 0.9, which is equivalent to 874.8 MW for the three units; additionally 874.8 MW is greater than 870 MW in order to avoid damage to the generators. Then in the new version of the PDD, according to the requirements of the CAR 1 of the assessment for validation, it will be clarified that the Total Installed Capacity of the Project, based on generators' Nameplate, is 874.8 MW. Likewise, in the new version of the PDD the Plant Load Factor of Sogamoso Project will be explained according to the Guidelines for the Reporting and Validation of Plant Load Factors of Executive Board of CDM. The text of the first paragraph of the section A.2. (Description of the project activity) in the new version of the PDD (attached to this table) was updated as shown below: *"The Sogamoso Hydroelectric Project (hereafter referred to as the "Project") developed by ISAGEN S.A. E.S.P. (hereafter referred to as ISAGEN) is a reservoir based hydropower project located in the Santander Department of the Republic of Colombia (hereafter referred to as the "Host Country"). Total Installed Capacity of the Project, based on the generators' nameplate, will be 874.8 MW comprised of three Francis turbines. The estimated average electricity production supplied to the Colombian National Interconnected System (also referred to as "the National Grid" or simply "the Grid") will be 5,056 GWh per year."* * Company founded in 1947 and with more than 60 years' experience, Ingetec SA participated in the development of major infrastructure projects in Colombia, and various engineering projects carried out in Argentina, Bolivia, Costa Rica, Canada, Chile, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Panama, Peru, Turkey and Venezuela. The firm has extensive experience in design, consultancy and supervision of hydroelectric and thermoelectric projects, transmission lines and substations, transportation and disposal of sewage, irrigation districts, roads (tunnels, bridges and viaducts), mass transport (metro, articulated buses), environmental and social studies, industrial developments, among others, leadership in the design of dams, tunnels, caverns and deep wells of large diameter.				
Documentation provided by project participant				
The extension of the surface of the reservoir was revised by Project Participants and we agree with the DOE. The data related to the area and the power density was adjusted in the new version of the PDD (version 2). *Revised PDD.*				
DOE assessment				**Date:** 12/03/2014
The installed capacity was revised in the PDD version 2 and is in accordance with the equipments specification and ACM0002 definitions. The installed capacity described in the PDD version 2 is 874.8 MW. Moreover the energy generation of 5,056 GWh is based on the study provided by Ingetec S.A. **CAR is closed.**				

CAR ID	2	**Section no.**	A.2.1	**Date:** 12/03/2014
Description of CAR				

The updated EIA, revision 1, dated December 2008 /16/, describes that the reservoir of the Sogamoso project will have a maximum volume of 4,800,000,000 m^3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of the reservoir. It is requested to PP to revise the reservoir area presented in the PDD version 1 of 6,960 ha. It is also requested to PP to revise the power density of the project activity.
Project participant response **Date:** 12/03/2014
The extension of the surface of the reservoir was revised by Project Participants and we agree with the DOE. The data related to the area and the power density was adjusted in the new version of the PDD (version 2).
Documentation provided by project participant
Revised PDD
DOE assessment **Date:** 12/03/2014
The reservoir area and power density were revised accordingly in the PDD version 2. **CAR is closed.**

CAR ID	3	**Section no.**	A.3.3	**Date:** 12/03/2014
Description of CAR				
Project participants shall provide the project's LoA, with the written approval of voluntary participation from the DNA of Colombia, including the confirmation that the Project assists the country in achieving sustainable development.				
Project participant response **Date:** 12/03/2014				
Due to changes in Colombian regulations regarding the process of requesting the approval from the Designated National Authority, the project participants applied under the new regulation requirements; therefore, the request for approval is still in process. **Second response:** Due to changes in Colombian regulations regarding the process of requesting the approval from the Designated National Authority, and due to changes in the structure of the Ministry of Environment, Housing and Territorial Development, which is the DNA of Colombia, the request for approval is still in process. **PP's third response:** Due to changes in Colombian regulations regarding the process of requesting the approval from the Designated National Authority, and due to changes in the structure of the Ministry of Environment, Housing and Territorial Development, which is the DNA of Colombia (and is named Ministry of Environment and Sustainable Development now), the socialization of the project had to be repeated, therefore PP's will request de LoA again, and subsequently PP's will send it to Rina. **PP fourth response.** The PP has updated the PDD accordingly in sections A.1 and F. In addition, the PP presented the following evidence: 1. Copy of the letter submitted by ISAGEN to the Colombian DNA on 2014/04/29, with clarifications regarding how the complaints received during the year 2012 was taken into account and how claims of the communities have been monitored, 2. Answer to the previous letter from the DNA to ISAGEN on 2014/07/23 ratifying that the project does contribute to the sustainable development of the country as stated in the LoA. 3. Copy of the reports in English and Spanish of the validation of the Sogamoso project as per WCD criteria. This report was elaborated by AENOR. The report concludes that the project ¨complies with all relevant requirements of the WCD and other criteria of the country in a satisfactory manner and in some respects in a higher than minimally required by Colombia national regulations.¨ (AENOR 2014/12/15).			
Documentation provided by project participant				
• Revised PDD • Letter submitted by ISAGEN to the Colombian DNA on 2014/04/29 • Answer to the previous letter from the DNA to ISAGEN on 2014/07/23 • Copy of the reports in English and Spanish of the validation of the Sogamoso project as per WCD criteria. This report was elaborated by AENOR				
DOE assessment **Date:** 12/03/2014				

LoA is still pending.

This CAR remains open.

Second response:

LoA is still pending.

This CAR remains open.

Third response:

LoA is still pending.

This CAR remains open.

Fourth response

RINA has received the LoA dated 02/10/2013 from the PP. The Colombian DNA confirms that the project meets the established requirements, however the PP is requested to explain in the PDD and provide its evidence how the complaints received during the year 2012 was taken into account.

In addition, explain in the PDD how the continuous monitoring of complains and claims of the communities will be monitored, as well as the progress of the project implementation.

This CAR remains open.

The PDD was revised accordingly and project participants provided communications between ISAGEN S.A. E.S.P. and Colombian DNA, demonstrating that the recommendations issued by Colombian DNA were properly considered.

CAR is closed.

CAR ID	4	**Section no.**	B.3.1	**Date:** 12/03/2014
Description of CAR				
PP is requested to include in the diagram presented in the section B.3 of the PDD version 1 the substation meters that measure the net energy delivered to the grid.				
Project participant response				**Date:** 12/03/2014
Responding to the request of the CAR 4 of the assessment for validation, we have updated the diagram presented in section B.3 of the PDD version 1, which includes electricity meters of the substation responsible for measuring the net energy delivered by the plant to the grid. The updated diagram was included in the new version of the PDD (attached to this table). The change of the diagram can be seen in the *"Annex 1 CAR 4 PDD Sog draft diagram.docx"* which is attached to this table of responses.				
Documentation provided by project participant				
Revised PDD				
DOE assessment				**Date:** 12/03/2014
The diagram presented in the section B.3 includes the energy meters that measures the net energy delivered to the grid. The diagram also includes the reservoir, project equipments and the Colombian National interconnected grid. **CAR is closed**.				

CAR ID	5	**Section no.**	B.5.4.2	**Date:** 12/03/2014
Description of CAR				
Project participants are considering different long term inflation indexes in the benchmark calculations and in the financial analysis calculations. Project participants should align all financial indicators (estimatives).				
Project participant response				**Date:** 12/03/2014
Responding to the request of the CAR 5 of the assessment for validation, the rate of inflation in Colombia taken from the source *The Economist* and used in the calculation of the benchmark was changed to the average inflation rate between 2008 and 2022 of the Ministry of Finance of Colombia, which is used by Isagen to prepare financial calculations of the project. Adjusted calculation for Benchmark is attached to this table of responses in the file *"Annex 2 CAR 5 benchmark calculation.xls"*. It is important to mention that changes in the calculation of benchmark cause changes in the result of the IRR because benchmark was used as a Discount Rate in the calculation of the Terminal Value in the cash flow, which implies the change in the IRR result. The adjusted financial model will be sent to the DOE as *"Annex 3"*.				
Documentation provided by project participant				
Annex 3 CAR 5 benchmark calculation.xls"				
DOE assessment				**Date:** 12/03/2014
Project participants are using the same assumptions of inflation rate in the Financial Analysis and Benchmark calculations. **This CAR is closed**.				

CAR ID	6	Section no.	B.5.4	Date: 12/03/2014

Description of CAR

Project participants had presented the positive and negative variations for the parameters (i) Power Price, (ii) Power Generation, (iii) Investment and (iv) Total Expenditures. The purpose of this sensitivity analysis is to assess the impact of more favorable scenarios on the IRR and the economic feasibility of the project, thus PP is requested to present the values to make the project IRR equal to benchmark and provide an assessment of the probability of the occurrence of these scenarios. Furthermore, the published PDD presents (Substep 2d: Sensitivity analysis) an IRR without CDM of 13.97% while the sensitivity analysis spreadsheet "*Proyecto Sogamoso - Análisis de Sensibilidad TIR.xlsx*" /31/ presents an IRR without CDM of 13.31%. Moreover all other calculation spreadsheets shall be revised accordingly and presented in the working language of the Board, English.

Project participant response **Date:** 12/03/2014

-For the variable Power Generation: the IRR is reached when the variable is increased by 24%. It is not feasible to increase power generation by 24%, since there are technical limitations that prevent reaching that level of generation, such as the water flows available, the hydraulic head of the plant, and the design of the electromechanical equipment. Additionally, taking into account the historical water inputs in the place of project´s dam, it is not realistic that the water flow increases, therefore, the possibility of increase of power generation is virtually zero.

- For the variable Power Price: the IRR is reached when the variable is increased by 15.8%. It is not feasible to reach this level, as explained and argued in the PDD version 1. Additionally, power price of the financial model corresponds to the greatest scenario of prices according to the Expansion Plan 2008-2022 by UPME which is an official study of the government used by electric sector Companies for their projections. Therefore, the possibility of increase of power prices is virtually zero.

- For the variable Investment: the IRR is reached when the variable is decreased by 17.9%. It is not feasible to reach this level, as explained and argued in the PDD version 1.

- For the variable Expenditures: the IRR is reached when the variable is decreased by 15%. It is not feasible to reach this level, as explained and argued in the PDD version 1.

Regarding the question related to the sensitivity analysis, there was a mistake in the typing of those specific values; therefore, they did not match. However, in response to CAR 5 of this Draft Validation Report, the values of the MSExcel file changed, which is shown in the adjusted file *"Annex 4 CAR 6 Sensitivity IRR Sogamoso Project 1mar11.xls"*, which is attached to this table. Based on the above, the typed values in the new version of the PDD and the values in the adjusted MSExcel file agree exactly.

Documentation provided by project participant

Sensitivity analysis spreadsheet.

DOE assessment **Date:** 12/03/2014

Project participants properly presented the sensitivity analysis with 10% of variation in each parameter and the value to make the project IRR equal to benchmark and provided an assessment of the probability of the occurrence of these scenarios.

CAR is closed.

CAR ID	7	Section no.	B.5.5	Date: 12/03/2014

Description of CAR

PDD version 1 presents the following barriers: financial and water inputs vulnerability.

Regarding the financial barrier, as per the additionality tool, this section should present information "*other than the economic/financial barriers in Step 2*". Therefore, as PP refers to Step 2, the financial barrier presented in the step 3 of the PDD shall be excluded.

Regarding the barrier of water inputs vulnerability, RINA considers that it is not a "real barrier" to prevent the project implementation, because the project has a firm energy based on historical data of the hydrological records for the period from January 1959 to 2003, calculated by a specialized company Ingetec S.A. /22/. Thus, PP is requested to further explain (other ways/grounds) how this barrier would be alleviated through CDM and how alternatives are prevented by this barrier

Project participant response **Date:** 12/03/2014

Responding to the requirements of CAR 7 of the assessment for validation, the analysis of barriers introduced in version 1 of the PDD was removed from the document. This can be seen in the new version of the PDD (attached to this table).

Documentation provided by project participant

Revised PDD

DOE assessment **Date:** 12/03/2014

The barrier analysis was removed from the PDD. Additionality presented in the PDD version 2 is based on the investment analysis.

This CAR is closed.

CAR ID	8	**Section no.**	B.5.6	**Date:** 12/03/2014

Description of CAR

The common practice analysis presented in the PDD version 1 is not totally in accordance to the requirements of the additionality tool /6/. In the sub-step 4a, PP shall provide an analysis of the hydropower plants that are considered similar to the proposed project activity, considering the tool definition: "Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc". For instance, "smaller" power plants (under 20 MW, as per Colombia regulations) are subject to different regulatory conditions and so they shall not be included in the analysis. Moreover, in the sub-step 4b, PP shall identify/discuss essential distinctions between the project activity and similar activities found in the sub-step 4a. PP shall provide documented evidences of the analysis (sources), to allow the assessment and confirmation of all presented information.

Project participant response **Date:** 12/03/2014

Responding to the requirements of CAR 8 of the assessment for validation, the texts corresponding to the analysis of common practice presented in version 1 of the PDD was modified in the new version of the PDD (attached to this table) as noted in the file "*Annex 5 CAR 8 PDD Sogamoso draft common practice for V2.doc"*, which is attached to this table of responses.

Second response:

According to the CAR 8 remaining open, the sub-step 4a of the common practice analysis was adjusted. The changes can be seen in the version 3 of the PDD attached to this table of responses.

PP's third response:

According to the CAR 8 remaining open, the step 4 of the common practice analysis was adjusted taking into account the updated version 6.0.0 of the "Tool for the demonstration and assessment of additionality", including the requirements for the common practice analysis ("*Guidelines on common practice*", version 01.0).

The proposed project activity meets all the new requirements of the tool.

The changes can be seen in the version 4 of the PDD attached to this table of responses.

Documentation provided by project participant

It has been revised the PDD and the annex "Selic_ver 1_nov-2010.xls and contract of civil works, dated 2010/10/16.

DOE assessment **Date:** 12/03/2014

The common practice analysis presented in the PDD version 2 is not in accordance with the requirements of the additionally tool.

In the step 4a, it is not clear the how PP has defined projects with similar scale. Moreover, as per the Additionality tool, the identification of similar activities has to be presented in the sub-step 4a.

In the step 4b as per the requirements of the tool, "*if similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers".*

This CAR remains open.

Second response:

During the validation, the "Tool for the demonstration and assessment of additionality" was updated to version 6, valid from 25/11/2011. Therefore, the new version has to be taken into account, including the requirements for the common practice analysis ("*Guidelines on common practice*", version 01.0).

This CAR remains open.

Third response:

PDD was updated accordingly, as per latest Tool version.

CAR is closed.

CAR ID	9	**Section no.**	B.6.5	**Date:** 12/03/2014

Description of CAR

As per the “Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)”, version 7, the section B.6.2 of the PDD shall “include a compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period and that are available when validation is undertaken. Data that becomes available only after validation of the project activity (e.g. measurements after the implementation of the project activity) should not need to be included here but in the table in section B.7.1”. Section B.6.2 of the PDD version 1 shall be revised as per the Guidelines

Project participant response	**Date:** 12/03/2014

Responding to the requirements of CAR 9 for the assessment for validation, section B.6.2 of the PDD version 1 was reviewed in accordance with the guidelines of the document "Guidelines for Completing the project design document (CDM-PDD) and the Proposed new baseline and monitoring Methodologies (CDM-NM)" version 7 and in accordance with the methodology ACM0002 version 12.1. Based on this review, in section B.6.2 of the new version of the PDD it was included only data or parameters that will not be monitored during the crediting period, and which are determined only once and remain fixed during the crediting period and which are available at validation.

For this reason, responding to the requirements of CAR 9 of the assessment for validation, and in coherence with the requirements of CAR 10, the only parameters of section B.6.2 of the new version of the PDD are: i) the installed capacity of the plant before the implementation of the project activity and ii) the reservoir area, measured on the surface of the water, before the implementation of the project activity. Other parameters shown in Section B.6.2 of the PDD version 1 were excluded from that section.

Documentation provided by project participant

Revised PDD.

DOE assessment	**Date:** 12/03/2014

PDD was revised and is in accordance with the requirements of the guidelines for completing the project design document (CDM-PDD) and the applied methodology.

The parameters available at validation are:

A_{BL}: Area of the reservoir before the implementation of project activity (Km^2): 0

(As per ACM0002, for new hydro power plants, this value is zero).

Cap_{BL}: Installed capacity of the small hydro power plant before the implementation of the project activity (MW): 0

(As per ACM0002, for new hydro power plants, this value is zero).

This CAR is closed.

CAR ID	10	**Section no.**	B.6.5	**Date:** 12/03/2014

Description of CAR

As per the applied methodology, the following parameters shall be available at validation:

*Cap_{BL}: Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero.

*****A_{BL}: Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero

Project participant response	**Date:** 12/03/2014

Responding to the requirements of CAR 10 of the assessment for validation, and in coherence with the requirements of CAR 9, the only parameters included in section B.6.2 of the new version of the PDD are: i) the installed capacity of the plant before the implementation of the project activity and ii) the reservoir area, measured on the surface of the water, before the implementation of the project activity. The value of both parameters was indicated as zero.

Documentation provided by project participant

Revised PDD.

DOE assessment	**Date:** 12/03/2014

PDD was revised accordingly. The parameters available at validation are in accordance with the applied methodology.

CAR is closed.

CAR ID	11	**Section no.**	B.7.1	**Date:** 12/03/2014

Description of CAR

The parameters CAP_{PJ} and A_{PJ} shall be presented in PDD section B.7.1 and included in the monitoring parameters of the project activity. Moreover, the parameter $EF_{grid,CM,y}$ shall be included in the monitoring plan.

Project participant response	**Date:** 12/03/2014

Responding to one of the requirements of CAR 11 of the assessment for validation, parameters CAP_{PJ} and A_{PJ} presented in section B.6.2 of the PDD version 1 were moved to section B.7.1 of the new version of the PDD.

On the other hand, the parameters that are already included in the monitoring plan of the version 1 of PDD are: $EG_{n,h}$, $EG_{m,y}$, $EF_{EL,n/m,y}$ and Merit order; these parameters are the basis for the calculation of the parameter $EF_{grid,CM,y}$, and therefore this parameter is included in the monitoring plan. However, taking into account the other requirement of CAR 11 of the assessment for validation, in section B.7.1 of the new version of the PDD, it was included a table with the respective indications, clarifying that this parameter is calculated based on the other parameters $EG_{n,h}$, $EG_{m,y}$, $EF_{EL,n/m,y}$ and Merit order, which were included in the monitoring plan of the PDD version 1 and remain in the new version of the PDD.

Documentation provided by project participant

Revised PDD

DOE assessment	**Date:** 12/03/2014

The tables presented in the section B.7.1 for the parameters **CAP_{PJ} and A_{PJ}** are not in accordance with the "Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)", version 7. Moreover as per the applied methodology, the monitoring frequency for both parameters is yearly.

Moreover, as per the methodology, the measurement procedure for the parameter **CAP_{PJ}** is "*Determine the installed capacity based on recognized standards*" and for the parameter **A_{PJ}** "*Measured from topographical surveys, maps, satellite pictures, etc*".

CAR is closed.

CAR ID	12	**Section no.**	B.7.3	**Date:** 12/03/2014

Description of CAR

PPs shall revise the PDD according to the "Guidelines for completing the project design document (CDM-PDD)" (*data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later*).

Project participant response	**Date:** 12/03/2014

Responding to the requirements of CAR 12 of the assessment for validation, the new version of the PDD, for all tables of the parameters to be monitored, in the row called "*Any comment"* the following text was put: *"Data will be archived during the whole crediting period and until two years after the end of the crediting period or the last issuance of CER's for this project activity, whichever occurs later".*

Documentation provided by project participant

Revised PDD

DOE assessment	**Date:** 12/03/2014

PDD was revised accordingly and data will be achieved as per the requirements of the Guidelines.

CAR is closed.

CAR ID	13	**Section no.**	B.5.3	**Date:** 12/03/2014

Description of CAR

As per the published PDD (version 1), the starting date of the project activity is 05/08/2009 as per Isagen Service Order 223-14508 /12/. Nevertheless, the earliest date at which either the implementation or construction or real action of this project activity began is evidenced by the Contract nº46/3147, dated 27/07/2009 /11/. PP is requested to revise PDD accordingly.

Project participant response	**Date:** 12/03/2014

The Project Participants had considered August 5, 2009 to be the starting date, because this date corresponds to the minutes of the meeting which officially documented the start of the main constructions of the project, which was considered to best demonstrate the real action to invest in the project activity.

However, in response to the indication of the DOE, the project participants agree that July 27, 2009 is the starting date of the project.

Documentation provided by project participant

Revised PDD

DOE assessment	**Date:** 12/03/2014

The starting date presented in the PDD version 2 was defined as per Glossary of CDM terms, version 5 and corresponds to the signature of the Contract # 46/3147, for the main construction services.

The spreadsheet with investment analysis was properly revised by project participants.

This CAR is closed.

CAR ID	14	**Section no.**	B.1.1	**Date:** 12/03/2014
Description of CAR				
The project applies the methodology ACM0002 version 11 which is no longer valid. Therefore PP is requested to update the PDD to the latest valid ACM0002 version (12.1.0, /2/ and, if applicable, to also revise calculations.				
Project participant response				**Date:** 12/03/2014
Version 12.1.0 of ACM0002 methodology was reviewed, and does not affect the analysis for the project because that new version only includes the definitions for reservoir and existing reservoir. In the new version of the PDD, the new version of the methodology was mentioned. **PP's second response:** According to the CAR 14 remaining open, PP's have checked the changes of the methodology's versions subsequent to 12.1.0 and have noticed that the new requirements do not affect the analysis for the proposed project activity. Nonetheless, the number of the new version of the methodology was included in the PDD.				
Documentation provided by project participant				
Revised PDD				
DOE assessment				**Date:** 12/03/2014
PDD version 2 is applying the version 12.1.0 of the methodology ACM0002. However, a new version (12.3.0, valid from 02/03/2012) of ACM0002 was released and PPs are requested to update the PDD to address mainly the new applicability requirement that incorporates changes to the baseline section on capacity additions. This CAR remains open. **Second response** Although not affecting the analysis, latest methodology version has being taken into account and updated in the PDD. **This CAR is closed.**				

CAR ID	15	**Section no.**	B.5.4	**Date:** 12/03/2014
Description of CAR				
PP shall clarify the difference between the benchmark (14.50%) presented in the benchmark spreadsheet (/27/) and the benchmark (15.47%) presented in the published PDD Table 4.				
Project participant response				**Date:** 12/03/2014
Initially PwC performed the benchmark calculation using the inflation rate from the source *The Economist.* However, just like the DOE, PwC realized that the inflation rate should be the same source as the inflation used in the financial model prepared by Isagen. Nevertheless, by mistake this value was not updated in the PDD. Based on the above, and taking into account the requirement of the CAR 5 of this Draft Validation Report, the typed values in the new version of the PDD (version 2) and the typed values of the adjusted MSExcel file agree exactly as 14.50%.				
Documentation provided by project participant				
Section B.5 of the revised PDD has been adapted to meet the requirements of "Guidelines for objective demonstration and assessment of barriers"				
DOE assessment				**Date:** 12/03/2014
PDD was revised accordingly.For the benchmark calculation, please, see CAR 5. **CAR is closed**.				

CAR ID	16	**Section no.**	B.5.4	**Date:** 12/03/2014
Description of CAR				
PP is requested to provide evidences of the plant load factor calculation (and address it in the PDD), as per the latest version of the "Guidelines for the reporting and validation of Plant load factors" /41/.				
Project participant response				**Date:** 12/03/2014

The numerical explanation about the Nameplate Capacity (874.8 MW), the maximum generation capacity (870 MW) and the Plant Load Factor is given in the file *"Annex 6 CAR 16 Sogamoso Power Calculation.xlsx"* attached to this table of responses.

The explanation and the evidences of the calculation of the Plant Load Factor are shown in the new version of the PDD (version 2) in the section A.4.3. (Technology to be employed by the project activity) as per the latest version of the "Guidelines for the reporting and validation of Plant load factors".

Documentation provided by project participant

"Annex 6 CAR 16 Sogamoso Power Calculation.xlsx"
Revised PDD

DOE assessment	**Date:** 12/03/2014

PP has included explanation how the Plant Load factor is in compliance with the "Guidelines for the reporting and validation of Plant load factors".

RINA has verified that the Plant Load factor was provided/calculated by a independent third part company INGETEC S.A. The energy generation of 5,056 GWh per year is provided in the document: "*Actualization of designs of tender and Environmental Impact Study for Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, revision 1 - June 9, 2008*". (The project design is based on the same document).

RINA has verified that the plant load factor is in accordance with the "Guidelines for the reporting and validation of Plant load factors" /41/ and corresponds to the following option:

(b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company).

CAR is closed.

CAR ID	17	**Section no.**	B.5.4	**Date:** 12/03/2014

Description of CAR

Project participants are requested to justify the different periods of data applied on calculation of benchmark.
Provide the evidences (with dates and version) of the following inputs applied on the investment analysis described on worksheet "InvDepTaxes" of worksheet "ISAGEN - Financial Model of the Sogamoso Project VF.xlsx":

- Civil works (cell C8);
- Equipment (cell C10);
- Engineering (cell C13);
- Replacement works (cell C14).

Revise the PDD, clearly indicating the investment decision date and verify if the described values of investment analysis are in accordance with the respective spreadsheet.

Project participant response	**Date:** 12/03/2014 01/07/2014 23/12/2014

First Answer 12/03/2014:

(response was transcribed from the e-mail sent by client on 12/03/2014)

At the file “Investment Analysis - Input Values Data Sources” delivered to RINA by ISAGEN, when RINA visited the project during validation, you can find two documents named: “19. Presupuesto Ajustado – 820MW and Documento Soporte del Presupuesto - Proyecto Sogamoso, where you see the project´s budget detail not only for the cells you define but also the total budget detail. However ISAGEN attached to this e-mail you will find the files named before for your information.

Revise the PDD, clearly indicating the investment decision date and verify if the described values of investment analysis are in accordance with the respective spreadsheet.

Second Answer:

According to your request, ISAGEN wants to let you know that there is a mistake in the investment reported by ISAGEN at the PDD. ISAGEN wants to clarify that the budget in USD constant 2008 raised to USD 1,528.5 million; this value is supported in the file named “Documento Soporte del Presupuesto - Proyecto Sogamoso” in the sheet named AGRUPACIONES, cell J16. According to this ISAGEN is going to modify the PDD document making the adjustment said before and will be sent to RINA.

In the other hand ISAGEN wants to inform that the Sogamoso Hydroelectric Project´s investment decision date is November 27 of 2008.

Third Answer as per RINA request on 01/07/2014:

The period used to calculate the risk free premium, was an average of 3 month for the period from March 2008 to May 2008. The reason for using an average for the period of 3 month is to eliminate any abrupt variation of the risk free rate near to the date of estimation. PDD was updated with this information (see foot note number 9).

The evidence of the input applied to the investment analysis was taken from the following documents:

INFORME DE REVISIÓN DEL ESQUEMA BASICO ACTUALIZACIÓN DISEÑOS DE LICITACIÓN Y ESTUDIO DE FACTIBILIDAD PROYECTO HIDROELÉCTRICO SOGAMOSO. INGETEC S.A. REV. 0 – ABRIL 29, 2008

PROYECTO HIDROELECTRICO DE SOGAMOSO. DISEÑOS BASICOS DE PRESA, OBRAS ANEXAS Y EQUIPOS ASOCIADOS. GRUPO I CONTRATO ISA 2966. COSTOS Y PRESUPUESTO. INGETEC REV 03. - OCTUBRE 31, 1996

PROYECTO HIDROELÉCTRICO SOGAMOSO ESTUDIO DE OPTIMIZACIÓN DE LA ALTURA DE LA PRESA Y DE LA CAPACIDAD INSTALADA INFORME FINAL. ANEXO C INDICADORES ECONÓMICOS Y FINANCIEROS DEL PROYECTO. INTEGRAL. MARZO DEL 2006

The referred documents are submitted to provide the evidence requested by RINA. (this information was also sent by the project participant on a separate e-mail submitted to RINA on October 9th)

The PDD has been updated and has been clearly indicated the investment decision date. The value of total investment was also verified in table four.

Fourth Answer as per RINA request on 23/12/2014

Regarding the request of the DOE to verify specific items of the budget presented in the file “Documento Soporte del Presupuesto - Proyecto Sogamoso.xlsx” an updated version of the files is presented under the name "Documento Soporte del Presupuesto - Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xlsx". The file was verified as follows:

A. In the updated file in the worksheet "PRESUPUESTO INGETEC", the PP would like to clarify that the values of the spreadsheet have been verified and minor adjustments to match the values of the supporting documents were done. The updated items are indicated in the referred worksheet as the lines in green color. The supporting evidence for this worksheet is in the following three documents: **Diseños INGETEC 1996:** Proyecto Hidroeléctrico Sogamoso. Diseños básicos presa, obras anexas y equipos asociados Grupo I – Contrato ISA 2966**; Estudio Integral 2005**: Proyecto Hidroeléctrico Sogamoso. Presupuesto detallado del proyecto optimizado, presa de gravas y capacidad instalada de 800MW.Febrero 04 de 2006**,** and **Lista de precios INGETEC 2008:** Presupuesto preliminar del squema básico del proyecto Sogamoso. Abril 21 de 2008.

B. Regarding to the worksheet “AJUSTES ISAGEN”, the PP updated the values by writing off some the costs due to unavailability of supporting evidence and to secure a conservative approach. These items are indicated in this worksheet as the cells in green color. In addition an updated list of supporting documents was submitted to RINA for review (Study from the consultant HMV, ISAGEN internal email of April 24th 2008 from Carlos Mauricio Mesa to ISAGEN, insurance payment of 2009).

C. Taking into account the modifications referred above in numerals A and B, the revised budget of the project is US$1,501,1 million that is 1,8% smaller in comparison with the budget presented in the version 6 of the PDD that amounted to US$1,528.5 million.

D. The PP updated the spreadsheet of the financial model with the value of the revised budget. Following this review, the information of the "Substep 2c: Calculation and comparison of financial indicators" in the additionality section of the PDD was updated.

E. As it is presented in version 7 of the PDD, the TIR of the project and the results of the sensitivity analysis remain below the benchmark set for the project.

In addition, the PP would like to highlight that the Sogamoso project has a comparable cost per kW when compared to hydropower projects of capacity larger than 500MW that are registered under the CDM (See file Comparison Investment cost Sogamoso vs other projects.xlsx). This benchmark shows that the budget of the Sogamoso hydro power is in line with the international practice for this kind of infrastructure projects. The data for this comparison was taken from the CDM Pipeline that is a publicly available information source.

Documentation provided by project participant

Several files listed above.

DOE assessment	**Date:** 02/07/2015

First response

Project participants did not provide the requested evidences (with dates and version) of the values applied on civil works, equipment, engineering and replacement works. Moreover the revised PDD with changes and clarification provide by project participants in this CAR was not provided.

This CAR is still open.

Second response

The values described on spreadsheet, "Documento Soporte del Presupuesto - Proyecto Sogamoso.xlsx" on worksheet "PRESUPUESTO INGETEC" are not the same described in document "Ingetec - 1996 - revisión 3.pdf", example the item "9.1.3 - Vías de acesso" present values differents from the presented on mentioned worksheet. The values of spreadsheet could be verified.
Some items of investment analysis are based on previous experience of ISAGEN (e.g.Campamentos de vivienda y campamentos de bodega. Evidences of the experience ISAGEN on such items must be provided

This CAR remains open

Third response

The periods applied on calculation of benchmark were properly justified. Nevertheless, the issues raised referents to items of investment analysis are still pending, once the provided evidences do not allow the verification of values applied on it

This CAR remains open

Furth response:

Project participants provided the requested evidences regarding the inputs paramters applied on investment analysis. Moreover were also provided the files "Documento Soporte del Presupuesto - Proyecto Sogamoso - Rev CAR 17 - Marzo 6 de 2015.xls" presenting the assumptions of all investment values and also the file "Lista de Precios Ingetec 2008.TIF" supporting the prices of the activities included in Sogamoso Hydroelectric Project.

This CAR is closed.

Table 3. FAR from this validation

FAR ID	xx	**Section no.**		**Date:** DD/MM/YYYY
Description of FAR				
N/A				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				**Date:** DD/MM/YYYY

Document information

Version	*Date*	*Description*
01.0	23 March 2015	Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: project activities, validation report

RINA Tables:

TABLE 1 MANDATORY REQUIREMENTS

Requirement	Reference	Conclusion
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	**OK**
2. The project shall assist non Annex I Parties contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2	**OK**
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art.12.5a CDM Modalities and Procedures §40a	~~**CAR 3**~~**OK**
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art.12.2 CDM Modalities and Procedure §40	~~**CAR 3**~~ **OK**
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance (ODA) and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7 CDM Modalities and Procedures Appendix B §2	**OK**
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	**OK**
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities and Procedures §30/31a	**OK**
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedure §31b	**OK**
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedure §31b	**OK**
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedure §43	**CL 4; CL 13; CAR 5; CAR 8** **OK**
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art.12.5b	**OK**
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are	CDM Modalities and Procedures §37c	**OK**

Requirement	Reference	Conclusion
considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	**OK**
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30/45 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	**OK**
15. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel.	CDM Modalities and Procedures §37e	**OK**
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §47	~~**CL 13**~~ ~~**CL 14**~~ **Ok**
17. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords, and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	**OK**

TABLE 2 REQUIREMENTS CHECKLIST

Checklist Question		Ref.	MoV[1]	Comments	Draft Conclusion	Final Conclusion
A. General Description of Project Activity						
A.1. Title of the project activity						
	Title of the project activity, version number and date of the PDD (section A.1).	/1/	DR	The title of project activity is Sogamoso Hydroelectric Project as per the published PDD version 1 of 21/06/2010.		**OK**
	Does the project comply with the applicable requirements for completing the PDDs?	/1//4/	DR	PDD is in accordance with the "Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM)", version 7 of 02/08/2008.		**OK**
A.2. Description of the proposed project activity						
	Does the PDD contain an accurate description of the project activity and provide the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation? How was the design of the project assessed?	/1/ /13/ /16//21/ /36/	DR/CC	The proposed project activity consists of the installation of a new hydro power plant by utilizing water resources (new reservoir) from the Sogamoso river. The ultimate objective of the project is not only to build a power plant for satisfying the expected increase in demand for electricity, but to contribute to the improvement in the efficiency of the electricity system in general, reducing fossil fuel supplied electricity generation and thus reducing CO_2 emissions, while contributing to the sustainable development of the region. As per the PDD version 1, the project activity consists of the installation of a new hydropower plant with installed capacity of 820 MW. However, as per the information presented in	~~**CAR 1**~~	**OK**

[1] MoV: DR document review, I interview, CC cross checking

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				the section A.4.3, confirmed through the generators specifications ("CC Cap 2-Parte II-5-418.pdf"), the total installed capacity of the project activity is 874.8 MW (3 generators of 324 MVA, power factor of 0.9). Moreover, as per the Power plant's design documentation: Ingetec S.A., Update of designs of tender and environmental impact study - Sogamoso Hydroelectric Project - Recommendations of installation for the power plant, rev. 1 - June 9, 2008 /21/, the average energy generation of 5,056 GWh per year is based on an installed capacity of 870 MW. It is requested to PP to revise the installed capacity of the project activity as per the definitions of the applied methodology ACM0002: "*The installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units*". The updated EIA, revision 1, dated December 2008 /16/, describes that the reservoir of the Sogamoso project will have a maximum volume of 4,800,000,000 m^3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of the reservoir. It is requested to PP to revise the reservoir area presented in the PDD version 1 of 6,960 ha. It is also requested to PP to revise the power density of the project activity.	~~CAR 2~~	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	Does the project activity involve alteration of existing installations? If yes, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	It was confirmed during site visit that the project activity is a Greenfield project (installation of a new renewable-hydro power plant).		**OK**
A.3.	**Project participants**					
	Have the Parties and project participants involved in the project been listed in tabular form in Section A.3 and are they consistent with the information detailed in Annex 1 of the PDD?	/1/	DR	The contact information is properly provided using the proper table (tabular format). The project participants are two entities: - ISAGEN S.A. E.S.P. (mixed private/public entity); and - PricewaterhouseCoopers Asesores Gerenciales Ltda (private entity). The project participants are correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD.		**OK**
	Do all participating Parties fulfill the participation requirements as follows: (a) Party has ratified the Kyoto Protocol; (b) Party has a Designated National Authority; (c) The assigned amount (*Annex I party*) has been determined.	/1/ /33/	DR	Colombia(host party), fulfills the requirements to participate in the CDM. Colombia ratified the Kyoto protocol on 30/11/2001 and have established as DNA the "Ministerio de Ambiente, Vivienda y Desarrollo Territorial" (verified at the UNFCCC website), according to the participating requirements for CDM under the Kyoto Protocol.		**OK**
	Have the letters of approval been issued?	/1/	DR	Project participants shall provide the project's LoA, with the written approval of voluntary	~~**CAR 3**~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				participation from the DNA of Colombia, including the confirmation that the Project assists the country in achieving sustainable development.		
	Do the letter/s of approval (LoA/s) confirm the following requirements? (a) The Party has ratified the Kyoto Protocol; (b) The participation is voluntary; (c) In the case of the host Party, the project contributes to the sustainable development of the country; (d) It refers to the precise project activity title in the PDD; (e) Has been issued by the respective Party's designated national authority (DNA). Indicate whether the LoA/s were received from the project participants or directly from the DNA. In case of doubt regarding the authenticity of the LoA/s, describe how it was assessed the authenticity of the LoA/s.	/1/	DR	See section A.3.3.	~~**CAR3**~~	**OK**
	Have all private/public project participants been authorized by a Party to the Kyoto Protocol?	/1/	DR	See section A.3.3	~~**CAR 3**~~	**OK**
A.4.	**Technical description of the project**					
	Is the project location clearly defined?	/1/	DR/CC	Yes. Project activity is located in Republic of Colombia, Department of Santander. The dam and the reservoir are located in jurisdiction of the municipalities of Girón, Betulia, Zapatoca, Los Santos and San Vicente de Chucurí, in the Department of Santander. Geographical coordinates are: 7° 6' 0.427"N, 73° 24' 26.623"W (confirmed in the Google Earth).		**OK**
	Does the project design engineering reflect current good practices? Would the technology result in a significantly better	/1/	DR	The project design engineering reflects current good practices. INGETEC (contracted constructor) is a very well-known company with extensive experience in, to give some		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	performance than any commonly used technologies in the host Country? Is any transfer of technology from any Annex I Party involved?			examples, design, consultancy and supervision of hydroelectric and thermoelectric projects, transmission lines and substations and main equipments suppliers will be international companies and all of them surely follow good practices. PP is requested to clearly address in the PDD if the technology to be used will result in a significantly better performance than any commonly used technologies in the host Country and if there is any transfer of technology from any Annex I Party involved.	~~CL 18~~	
	If public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/	DR	No public funding is provided for the Sogamoso Hydroelectric Project.		**OK**
B. Application of a baseline and monitoring methodology						
	B.1. Methodology applied					
	Does the project activity apply an approved methodology and the correct version?	/1/	DR	The project applies the methodology ACM0002 version 11 which is no longer valid. Therefore PP is requested to update the PDD to the latest valid ACM0002 version (12.1.0, /2/ and, if applicable, to also revise calculations.	~~CAR 14~~	**OK**
	B.2. Applicability criteria of the methodology/tools					
	The project activity complies with the applicability criteria?	/1/ /2/	DR/CC	Please refer to CAR 1 and CAR 2.	~~CAR 1~~ ~~CAR 2~~	**OK**
	Is the selected baseline one of the baseline(s)	/1/	DR	Yes.		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	described in the methodology and this hence confirms the applicability of the methodology?			The baseline scenario in the PDD version 1 is defined as per ACM 0002 version 11 methodology: Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. The applicability of the methodology is confirmed.		
B.3.	**Project boundary**					
	Is the project boundary clearly defined and in accordance with the applied methodology?	/1//39/	DR	The project boundary of the project activity is in accordance with methodology ACM 0002. It is represented by the Colombian National Interconnected System (SIN) /39/and the physical and the geographical site where the electric generation plant, dam and reservoir are located. PP is requested to include in the diagram presented in the section B.3 of the PDD version 1 the substation meters that measure the net energy delivered to the grid.	~~**CAR 4**~~	**OK**
	What are the project's system boundaries (components and facilities used to mitigate GHGs)?	/1/	DR	See section B.3.1.	**CAR 4**	**OK**
	Which sources are identified for the project? Does the identified project boundary cover all possible sources linked to the project activity?	/1/	DR	In the baseline, the main emission source is the CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.		**OK**
	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute by more than 1% to the estimated emission reductions of the project?	/1/	DR	It was not identified other emissions not foreseen by the methodology.		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
B.4.	**Baseline scenario identification**					
	Which baseline scenarios have been identified? Is the list of the baseline scenarios complete?	/1//6//7/	DR	As per the applied methodology (ACM0002), as the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is already defined and therefore there is no need to identify alternative scenarios. PP is requested to revise PDD accordingly.	~~**CL2**~~	**OK**
	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1//6//7/	DR	The project activity has followed the methodology and the "Tool for the demonstration and assessment of additionality" (Version 5.2) to assess the baseline and additionality of the proposed project activity.		**OK**
	What is the baseline scenario? Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1//6//7/	DR	As per the published PDD, the applied methodology is ACM 0002 /2/and the baseline scenario for the project activity is: Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" /7/		**OK**
	Has the baseline scenario been determined using conservative assumptions? Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1//6//17//29//38/	DR	As stated in section B.4.1 and B.4.2, the baseline scenario has been selected in accordance with the requirements of the applied baseline methodology as well as relevant national and sectoral policies /1//6//17//29//38/		**OK**
B.5.	**Additionality determination**					
	What tool does the project use to assess additionality? Is this in line with the methodology?	/1//6/7/	DR	As the project activity is not a retrofit or replacement of an existing grid-connected renewable power plant/unit(s) at the project site, the additionality is demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality"		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				(Version 5.2), as indicated in ACM 0002.		
	What is the project additionality mainly based on?	/1//6//7/	DR	In the PDD version 1, the investment analysis has been used to demonstrate the additionality of the proposed project activity. Moreover, PP also presented the following barriers: financial and water inputs vulnerability.		**OK**
	Prior consideration of CDM					
	What is the starting date of the proposed project activity?	/1//8//11/12//18/	DR/ CC	The project's starting date was defined as 05/08/2009 in the published PDD (version 1). Isagen has provided during the site visit two documents related to the projects' starting date: - the contract for the main services work (deviation tunnels, access tunnels and caverns to install turbines, generators, etc) between ISAGEN S.A. E.S.P. and Grupo ICT S.A.S (nº 46/3147) /11/, signed on 27/07/2009; and - the document ISAGEN Service Order /12/ (from Spanish "Orden de Inicio de las actividades del Contrato") is part of the contract /11/. This service order was signed on 03/08/2009 (after the Contract Insurance policy was confirmed) and establishes that the contract activities are to start on 05/08/2009 (the contractual period starts on 05/08/2009). As per the published PDD (version 1), the starting date of the project activity is 05/08/2009 as per Isagen Service Order 223-14508 /12/. Nevertheless, the earliest date at which either the implementation or construction or real action of this project activity began is evidenced by the Contract nº46/3147, dated 27/07/2009 /11/. PP is requested to revise PDD accordingly.	~~**CAR 13**~~	**OK**
	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with	/1//5//25//34/	DR	As the project activity is a new project activity (starting date on or after 02 August 2008, for		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	the project activity?			which PDD has not been published for GSC before project start date) the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. It was verified in the UNFCCC web site that such notification was received on 16/10/2009. RINA also verified the below evidences/25/ related to the Host Party DNA notification: - Outlook delivery receipt of the email sent to Colombia DNA, dated 02/10/2009 ("Envio de Comunicacion 17172749_09. outlook item"); - Isagen letter number 17172749 sent to the Colombia DNA with the template provided in the EB 48, annex 62 fulfilled, dated 01/10/2009 ("Carta de Notificacion DNA - 17172749_09.tiff"). All notifications were provided within six months of the project activity start date. Therefore, the CDM prior consideration by project participant is correctly demonstrated, as per the current CDM prior consideration guidelines /5/. In order to be in line with the evidences provided for the CDM consideration, PP shall update the following information in the PDD: the email sent to the Colombia DNA is dated 02/10/2009 and, as per the UNFCCC web site, the notification was received on 16/10/2009.	~~CL3~~	
	What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR	Not applicable. The project activity is a new project activity.		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Not applicable. The project activity is a new project activity.		**OK**
	Investment analysis					
	What is the analysis method used to determine whether the proposed project activity is not (a) the most economically or financially attractive; or (b) economically or financially feasible, without the revenue from the sale of certified emission reductions?	/1//6/	DR	Among the three options available for investment analysis as discussed in the "Tool for the demonstration and assessment of additionality", project participants have chosen the benchmark analysis as the other two options are not applicable. The simple cost analysis is not applicable because the project will generate financial and economic benefits (from electricity sales) other than CDM related income. The investment comparison analysis is not applicable because there is not a similar investment project. Project participants are requested to justify the different periods of data applied on calculation of benchmark. Provide the evidences (with dates and version) of the following inputs applied on the investment analysis described on worksheet "InvDepTaxes" of worksheet "ISAGEN - Financial Model of the Sogamoso Project VF.xlsx": • Civil works (cell C8); • Equipment (cell C10); • Engineering (cell C13); • Replacement works (cell C14). Revise the PDD, clearly indicating the investment decision date and verify if the described values of investment analysis are in	~~**CAR 17**~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				accordance with the respective spreadsheet.		
	What financial indicator is used?	/1//27//28//37/	DR	In the PDD version 1, project participants chose as a financial indicator the Project's IRR (internal rate of return) that was compared with Cost of Equity (Ke), because the project was evaluated without considering debt for its financing. Thus, at the time of the investment decision, project participants assumed that the project would be financed with its own resources. Project participants should clarify if it is considered in the Project Sogamoso the investment financing from third parties and what is the equity/debt proportion of the project. If the financing is being considered in the project, project participants should revise the financial analysis and/or the benchmark analysis to adequate it to the paragraph 12 of the latest "Guidelines on the assessment of investment analysis" version (/37/): *"…benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented*". Project participants provided the spreadsheet "Benchmark of the electric sector.xls" /27/ with all parameters, assumptions of calculation and the sources of information.	~~CL4~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				PP shall clarify the difference between the benchmark (14.50%) presented in the benchmark spreadsheet (/27/) and the benchmark (15.47%) presented in the published PDD Table 4.For the Cost of Equity calculation, Project Participants applied the formula: Ke = Rf + (Rm-Rf)*b + Rp. The “Rf” is the Risk Free Rate, based on 20-years US Treasury Coupon Bond Yield, the “Rm” is the Market Profitability based on the Risk Free plus the Market Risk Premium that was calculated by PricewaterhouseCoopers, “b” is the Adjusted Industry Beta based on Average Beta US electric-generation. US data is trustable/reliable/transparent and could be considered an “ideal” market. The equity cost is calculated for an US similar market, adding the country risk premium and converting US dollars to local Colombian Pesos (COP) using the long term estimated inflation index in United States and Colombia. Project participants are considering different long term inflation indexes in the benchmark calculations and in the financial analysis calculations. Project participants should align all financial indicators (estimatives). All economic/technical studies mention 2008 as the time of investment decision. Furthermore in the benchmark spreadsheet-worksheet "assumptions" /27/ the sources are properly mentioned as well as the actualization dates of the presented figures. Also all evidences mentioned in the benchmark support documentation /28/) refer to the year 2008.	~~CAR 15~~	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				All sources presented by project participants are valid and applicable at the time of the investment decision taken by the project participant /28/	~~CAR 5~~	
	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the Host Country?	/1//26/	DR	Project participants included the income tax in the financial calculations spreadsheet. According to the provided document "7. LEY_1111 de 2006 - Tarifa del Impuesto de Renta.pdf", in Colombia the Income tax is 33%/26/. The depreciation was taken into account, however the depreciation system applied is not clear. Project participants shall clarify the chosen depreciation system, including the distinction between "tax depreciation" and "accounting depreciation", the depreciation periods and justify the reason to apply in the income tax calculations just the difference between "fiscal depreciation" and "accounting depreciation". Official sources from local institutions or government about depreciation system in Colombia should be provided.	~~CL5~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is the working capital returned in the last year of the operation?	/1//19//37/	DR/CC	All financial calculations (spreadsheet "ISAGEN - Modelo Financiero Proyecto Hidroelectrico Sogamoso -English Version.xlsx" – *Sogamoso hydroelectric project financial model*) are considering a period of 50 years. For the IRR calculation it was taken into account just the first 20 years after the operational start-up of the plant. This 20 year's period is considered adequate to the presented analysis. There is a salvage value in the end of the cash flow, however this salvage value was not calculated taken into account the depreciation and the return of the working capital, it is a calculation with the last year cash flow and a cost of capital value. Project participants shall justify the salvage value calculations. According to the EB 51 – Guidelines on the assessment of the investment "It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets"		**OK**
	Cross-check of main parameters used in the financial analysis: electricity generation, electricity tariff, investment costs, operating and maintenance costs, taxes, other costs. The main parameters can be changed for the different project categories.	/1//19//21//29//30//32/	**DR/CC**	Project participants presented the IRR spreadsheet "ISAGEN - Modelo Financiero Proyecto Hidroelectrico Sogamoso.xls" /19/ with the calculations of the financial indicators. All values of Revenues, Investments and Costs are presented in Colombian Pesos (COP). <u>Revenues</u>: Project participants provided the annex "2.1. Análisis UPME 2008-2022.xls" /32/ with an estimative of electricity price in Colombia from 2008 until 2022, however it is not evidenced the	~~**CL7**~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				values used in the financial analysis. Project participants shall indicate in the annex "2.1. Análisis UPME 2008-2022.xls" where are the values used in the financial analysis calculations and should demonstrate the sources of the data used in this estimative. Furthermore, PP is requested to explain the electricity price value of 46.91 USD/MWh (2008) presented in the annex "2.1. Análisis UPME 2008-2022.xls" /32/ while the published PDD mentions (Table 5) a value of 46.92 USD/MWh (2008). In the IRR spreadsheet, there is a worksheet "Ingresos" with all revenues of project Sogamoso. There are seven different revenues lines (CIF, Regulado, Ventas Bolsa, Cargo Confiabilidad, Ventas AGC and Transacciones Forzadas). Project participants shall clarify the characteristics of each revenue line in the worksheet "Ingresos", summarizing how is calculated/estimated the price, what is the proportion in the electricity generation and if is based in contracts, auctions, free negotiations, etc. All evidences about calculated/estimated revenues shall be provided.	~~CL8~~	
				<u>Costs</u>: In the Financial Analysis project participants are considering a total amount of Costs and Expenses that are about 45% of the yearly total revenues. Almost all lines of Costs are about Taxes and Tariff over the electricity generation. Project participants provided some documents (as the	~~CL9~~	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				law 99 /29/ and spreadsheet “O&M Costs” /30/) but there are no evidences or is difficult to identify and to check the related document for some lines (for instance: Capacity Charge, Final CFI, Law 99, FAZNI, CND-ASIC, CREG-SSPD, Insurance and Land Taxes) and to validate the applied value in the financial analysis with the number presented in the document (it is difficult to cross check the values used in the financial analysis). Project participants shall provide the evidences for all relevant costs, expenses and taxes (including an explanation about the application of taxes other than income tax and depreciation) and shall present in the financial analysis a note with the name of the document and if necessary a note about the applied value/s The O&M Costs presented by project participants is about 3% of total revenues in the first operational year and about 1% in the last year of operation. Project participants shall explain the calculations to estimate the O&M costs (named in the financial analysis spreadsheet “AOM”), shall clarify the small participation of this important line in the total cost amount and shall justify the reason to index this spending to the USD instead of the local currency, which generates the lowest share of this spending in the end of the project life. <u>Investments</u>: Sogamoso Hydroelectric Project is a 2,714,974 COP millions (1,397 USD millions at 1,944 COP/USD – exchange rate for 2008 provided by project participants). The	~~CL10~~	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				investment is divided in seven different years as follows: 2008 – 0.4% 2009 – 21.4% 2010 – 14.8% 2011 – 23.9% 2012 – 29.4% 2013 – 9.0% 2014 – 1.1% The main investment items and its participation in total investment are: Construction = 57%; Equipments = 22%; Other Construction items = 14%. According to the financial analysis spreadsheet (version 1), all investment will be covered by own project participants capital and funding is not being considered.	~~CL11~~ ~~CAR 16~~	
	Sensitivity analysis: have the key parameters contributing more than 20% of the revenue/costs during operating or implementation been identified?	/1//31/	DR/CC	Project participants presented in PDD the sensitivity analysis (+/- 10% range) with a table of results and the discussion of the likelihood of occurrence of the scenarios. In the financial analysis spreadsheet, it is not clear how to perform the sensitivity analysis to reproduce the results presented in PDD. Project participants shall provide in the financial analysis spreadsheet an easier way to reproduce the sensitivity analysis results presented in PDD.	~~CL12~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				The annex "Proyecto Sogamoso - Análisis de Sensibilidad TIR.xls" /31/ was presented by Project participants with the sensitivity analysis summary. The following parameters were taken into account in the sensitivity analysis: (i) Power Price, (ii) Power Generation, (iii) Investment and (iv) Total Expenditures. All parameters contribute with more than 20% of the revenue/costs and there is no relevant parameter outside of the analysis. The magnitude of IRR variations will depend on the extent to which these parameters vary and Project participants presented a sensitivity analysis with 10% positive and negative variations for all parameters. Project participants had presented the positive and negative variations for the parameters (i) Power Price, (ii) Power Generation, (iii) Investment and (iv) Total Expenditures. The purpose of this sensitivity analysis is to assess the impact of more favorable scenarios on the IRR and the economic feasibility of the project, thus PP is requested to present the values to make the project IRR equal to benchmark and provide an assessment of the probability of the occurrence of these scenarios. Furthermore, the published PDD presents (Substep 2d: Sensitivity analysis) an IRR without CDM of 13.97% while the sensitivity analysis spreadsheet "*Proyecto Sogamoso - Análisis de Sensibilidad TIR.xlsx*" /31/ presents an IRR without CDM of 13.31%. Moreover all other calculation spreadsheets shall be revised accordingly and presented in	~~CAR 6~~	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				the working language of the Board, English.		
	Sensitivity analysis: the range of variations is reasonable in the project activity? The main parameters can be changed for the different project categories.	/1/	DR	The sensitivity analysis, with the parameters chosen and the range of variations are reasonable and applicable to the project activity.		**OK**
	Have the key parameters been varied to reach the benchmark and the likelihood of this happening been justified?	/1/	DR	Project participants presented a Sensitivity Analysis with a +/-10% range/variation, for all parameters. Since the 10% variation for all parameters didn't presented an IRR more favorable than the benchmark, it would be more useful to show how large should be these variations to make the project IRR equal the benchmark. Then a second analysis should be applied to discuss the likelihood of occurrence of these scenarios.	~~**CL13**~~	**OK**
	Barrier analysis					
	Are the barriers identified complimentary to a potential investment analysis?	1/1//6// 22/	DR	PDD version 1 presents the following barriers: financial and water inputs vulnerability. Regarding the financial barrier, as per the additionality tool, this section should present information "*other than the economic/financial barriers in Step 2*". Therefore, as PP refers to Step 2, the financial barrier presented in the step 3 of the PDD shall be excluded. Regarding the barrier of water inputs vulnerability, RINA considers that it is not a "real barrier" to prevent the project implementation,	~~**CAR 7**~~	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				because the project has a firm energy based on historical data of the hydrological records for the period from January 1959 to 2003, calculated by a specialized company Ingetec S.A. /22/. Thus, PP is requested to further explain (other ways/grounds) how this barrier would be alleviated through CDM and how alternatives are prevented by this barrier.		
	How were the investment barriers assessed to be real? How does CDM alleviate the investment barriers?	/1/	DR	See section B.5.5.1	~~CAR 7~~	OK
	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	See section B.5.5.1	~~CAR 7~~	OK
	How were the technological barriers assessed to be real? How does CDM alleviate the technological barriers?	/1/	DR	To demonstrate the additionality, the project apply the investment barrier and no other barriers have been discussed		OK
	Is the project activity prevented by the technological barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Please refer to section B.5.5.4.		OK
	How were the barriers due to prevailing practice assessed to be real? How does CDM alleviate the barriers due to prevailing practice?	/1/	DR	Please refer to section B.5.5.4.		OK
	Is the project activity prevented by the barriers due to prevailing practice and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Please refer to section B.5.5.4.		OK
	How were the other barriers assessed to be real? How does CDM alleviate the other barriers?	/1/	DR	See section B.5.1.1	~~CAR 7~~	OK
	Is the project activity prevented by the other barriers and is at least one of the possible	/1/	DR	See section B.5.1.1	~~CAR 7~~	OK

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	alternatives to the project activity is feasible under the same circumstances?					
	Common practice analysis					
	What are the geographical scope and scope of technology of the common practice analysis?	/1//6/	DR	The common practice analysis presented in the PDD version 1 is not totally in accordance to the requirements of the additionality tool /6/. In the sub-step 4a, PP shall provide an analysis of the hydropower plants that are considered similar to the proposed project activity, considering the tool definition: “Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc”. For instance, “smaller” power plants (under 20 MW, as per Colombia regulations) are subject to different regulatory conditions and so they shall not be included in the analysis. Moreover, in the sub-step 4b, PP shall identify/discuss essential distinctions between the project activity and similar activities found in the sub-step 4a. PP shall provide documented evidences of the analysis (sources), to allow the assessment and confirmation of all presented information.	**~~CAR 8~~**	**OK**
	How many similar non-CDM-projects exist in the region within the project’s scope?	/1/	DR	See section B.5.6.1	**~~CAR 8~~**	**OK**
	How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	See section B.5.6.1	**~~CAR8~~**	**OK**
	What is the data source(s) used for the common practice analysis?	/1/	DR	See section B.5.6.1	**~~CAR8~~**	**OK**
	Conclusion on the additionality assessment					
	What is the conclusion with regard to the	/1/	DR	Additional information needs to be provided by	**~~CL 4~~ to ~~CL13~~**	

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	additionality of the project activity?			PP.	**CAR5 to ~~CAR8~~**	
B.6.	**Calculation of GHG emission reductions**					
	Baseline emissions					
	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	//1//2/	DR	Baseline emissions calculations are documented (PDD version 1) according to the approved methodology ACM 0002 /2/. Baseline emissions are calculated by multiplying the energy delivered to the grid by the emission factor: $B_{ey} = EG_{PJ,y}. * EF_{grid,CM,y}$		**OK**
	Have conservative assumptions been used when calculating the baseline emissions and are the uncertainty estimates properly addressed?	/1//2//7/ /10//21/	DR/CC	During site visit, it was possible to check that the emission factor is calculated automatically by a program, using the information public available from Colombia National Dispatch Center (CND-XM) through the database Neon, and data from the Energy Mining Planning Unit (UMPE). Moreover, PP provided a spreadsheet with an example of calculation for 2 days ("*FE 2008 a Rina 22jun10.xlsx*"). However, for transparency, PP shall prepare a spreadsheet (reproducible) where it is possible to confirm all the emission factor data and calculations. PP shall clarify (source) the formula used in the sub-step 4.2 of the calculation of the Grid emission factor presented in the PDD version 1. The presented formula is not mentioned in the "Tool to calculate the emission factor for an electricity system" /7/. Moreover, the latest version of the referred Tool shall be applied in EF calculations and spreadsheet/s and published PDD shall be revised accordingly, as per Tool steps.	**~~CL14~~** **~~CL15~~**	**OK**
	Project emissions					
	Are the calculations documented according to the	/1//2//1	DR/CC	According to the PDD version 1, considering an		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	approved methodology and in a complete and transparent manner?	6//36/		installed capacity of 820,000,000 W and a reservoir area of 69,600,000 m^2, the power density of the project activity is calculated as equal to 11.78 W/m^2. The updated EIA, revision 1, dated December 2008 /16/, describes that the reservoir of the Sogamoso project will have a maximum volume of 4,800,000,000 m^3, and an extension of 7,590 ha. This area is also confirmed in the Resolution 1497 of 2009, article 1 (page 115) /36/, authorizing the construction of the reservoir. It is requested to PP to revise the reservoir area presented in the PDD version 1 of 6,960 ha. It is also requested to PP to revise the power density of the project activity.		
	Have conservative assumptions been used when calculating the project emissions and are the uncertainty estimates properly addressed?	/1//2/	DR	Please refer to B.6.2.1.	~~**CAR2**~~	**OK**
	Leakage					
	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1//2/	DR	As per the applied methodology (ACM0002), no leakage emissions are considered.		**OK**
	Have conservative assumptions been used when calculating the leakage and are the uncertainty estimates properly addressed?	/1//2/	DR	Please refer to section B.6.3.1.		**OK**
	Emission reductions					
	Has the methodology been correctly applied to calculate the emission reductions and can this be replicated by the data provided in the PDD and supporting files to be submitted for registration?	/1//2/	DR	Yes, the methodology was correctly applied.		**OK**
	Data and parameters that are available at validation and that are not monitored					
	How were the parameters available at validation verified?	/1//2//4/	DR	As per the "Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				(CDM-NM)", version 7, the section B.6.2 of the PDD shall "include a compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remains fixed throughout the crediting period and that are available when validation is undertaken. Data that becomes available only after validation of the project activity (e.g. measurements after the implementation of the project activity) should not need to be included here but in the table in section B.7.1". Section B.6.2 of the PDD version 1 shall be revised as per the Guidelines As per the applied methodology, the following parameters shall be available at validation: *Cap_{BL}: Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero. ***A_{BL}**: Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero	~~CAR 10~~	
B.7. Monitoring plan						
	Data and parameters monitored					
	Does the monitoring plan described in the PDD comply with the requirements of the methodology?	/1/	DR	Please see B.7.1.2.	~~CAR 11~~	**OK**
	Does the monitoring plan contain all necessary parameters and are they clearly described?	/1//2/	DR/CC	The parameters CAP_{PJ} and A_{PJ} shall be presented in PDD section B.7.1 and included in the monitoring parameters of the project activity. Moreover, the parameter $EF_{grid,CM,y}$ shall be included in the monitoring plan.	~~CAR 11~~	
	Is the measurement equipment described? Is the accuracy of the measurement equipment	/1//42/	DR	The accuracy of the energy meters will be class 0.2.		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	addressed and deemed appropriate? Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?			PDD version 1 establishes that the meters will be calibrated in Metrology Laboratories properly accredited by the Superintendence of Industry and Commerce of Colombia. After the calibration, the meters will be sealed. Moreover, ISAGEN has a verification and re-calibration program which is to be carried out every two (2) years. The following requirements shall be met by the multifunctional meters: - Standards: ICONTEC – NTC 2147, IEC 61000-4-7/4-15, 62053-22 or ANSI equivalent; - Regulation/s: Networks Code of SIN, Measurement Code, CM-1 annex (Ministry of Mines and Energy –Resolution 025, dated 13/07/1995). Data for the emission factor calculation will be obtained from the following national entities: *National Dispatch Center (CND) (available upon registry): - Hourly national electricity generation by plants/units connected to the National Grid; -Hourly energy bidding prices of plants/units connected to the National Grid. * Energy Mining Planning Unit (UPME): - Efficiency of power plants/units (conversion factors) expressed in units of thermal energy to electric energy - data obtained from UPME for every plant connected to the Grid; - Information on the most recent built plants/units; - Fuel Emission Factor expressed in units of $kgCO_2/TJ$ – information obtained from the official database (applicative) “FECOC”		

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				((Factores de Emisión de los Combustibles Colombianos – *Emission factors of Colombian fuels*), published by the UPME.		
	Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1//2/	DR/CC	Yes, the monitoring and record frequency of the energy delivered to the grid complies with the requirements of the monitoring methodology. Energy delivered to the grid will be continuously monitored, recorded hourly and daily sent to the CND (National Dispatch Center).		**OK**
	Is the recording frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1/	DR	Yes, see section B.7.1.4 above.		**OK**
	Monitoring of sustainable development indicators/ environmental impacts					
	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	The monitoring methodology ACM0002 and the Colombian DNA do not require the monitoring of social and environmental indicators.		**OK**
	Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Not applicable.		**OK**
	Are the sustainable development indicators in line with stated national priorities in the host country?	//1/	DR	Not applicable.		**OK**
	Management, quality assurance and quality control					**OK**
	How it has been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR/CC	No monitoring arrangements were yet installed during the on-site visit. Nevertheless, RINA can confirm that the monitoring arrangements described in the monitoring plan are feasible within the project design.		**OK**
	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Yes. Verified during site visit that Isagen has the experience in energy generation and commercialization. The procedures for the energy generation and		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				the emission factor monitoring are properly explained in the section B.7.2 of the PDD and Annex 4. Electricity meters will be installed and calibrated according to relevant national standards (please refer to B.7.1.3). The data management and quality control procedures are sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported *ex post* and verified.		
	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported *ex post* and verified?	/1//2//23/	DR/CC	Yes. The indicated QA/QC procedures are in line with the applied methodology. The electricity supplied to the grid will be monitored by electronic calibrated and inviolable (sealed) energy meters. The Wholesale market has a system that archives the records of all commercial transactions. This database will be compared against the records of the project activity. Moreover, it was verified that Isagen has got the following ISO certificates: * ISO 9001:2008, # SC-193-1 / ICONTEC, First issuance on 17/03/1999, Valid until 26/02/2011; * ISO 14001:2004, # SA-073-1 / ICONTEC, First issuance on 28/05/2003, Valid until 05/03/2011; * ISO 180011:2007, # CO-OS-097-1 / ICONTEC, First issuance on 11/05/2010, Valid until 10/05/2013.		**OK**
	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later?	/1//4/	DR	PPs shall revise the PDD according to the "Guidelines for completing the project design document (CDM-PDD)" (*data monitored and required for verification and issuance are to be kept for two years after the end of the crediting*	**CAR 12**	**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				period or the last issuance of CERs for this project activity, whichever occurs later).		
C. Duration of the project activity and crediting period						
	C.1. Start date of project activity					
	What is the expected project's starting date of the project activity and how it has been determined? When was the first construction activity?	/1//8//11//18/	DR/CC	The project's starting date was defined as 05/08/2009 in the published PDD (version 1). Isagen has provided during the site visit two documents related to the projects' starting date: - the contract for the main services work (deviation tunnels, access tunnels and caverns to install turbines, generators, etc) between ISAGEN S.A. E.S.P. and Grupo ICT S.A.S (nº 46/3147) /11/, signed on 27/07/2009; and - the document ISAGEN Service Order /12/ (from Spanish "Orden de Inicio de las actividades del Contrato") is part of the contract /11/. This service order was signed on 03/08/2009 (after the Contract Insurance policy was confirmed) and establishes that the contract activities are to start on 05/08/2009 (the contractual period starts on 05/08/2009). As per the published PDD (version 1), the starting date of the project activity is 05/08/2009 as per Isagen Service Order 223-14508 /12/. Nevertheless, the earliest date at which either the implementation or construction or real action of this project activity began is evidenced by the Contract nº46/3147, dated 27/07/2009 /11/. PP is requested to revise PDD accordingly.	~~**CAR 13**~~	**OK**
	What is the expected operational lifetime of the project activity? Is it deemed reasonable?	/1//14//15//35/	DR	The expected operational lifetime of the project was defined in the published PDD as 50 years (0 months), and deemed reasonable. This was confirmed through the article from National Society of Mining, Oil and Energy, published in		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				the web link: http://www.reddeenergia.com/mostrarnoticia.php?idnoticia=17314 <accessed on 09/07/2010>/14and by a paper from the Münchener Rück - Munich Re Group entitled "Tecnología para underwriter - 38 Centrales hidroeléctricas.pdf" (2009) /15/ which mention a lifetime of 50 years for hydro plants. Furthermore, project participants provided a survey of hydroelectric plants operating in Colombia (data from CND -XM) which shows that 6 plants are operating for more than 40 years /35/. Nevertheless, in case the lifetime of some of the equipment happens to be shorter than the duration of the CDM project activity, project participants will ensure their replacement (if necessary) with equipment of equal or similar technical and operational specifications, therefore the characteristics considered for the CDM project will remain the same.		
C.2. Start date of crediting period						
	What is the expected crediting period starting date of the proposed project activity?	/1/	DR	According to the published PDD, the expected crediting period starting date of the proposed project activity is 01/01/2014 or the date of registration, whichever is later.		**OK**
	What is the length of the crediting period? Is it clearly defined and deemed reasonable?	/1/	DR	According to the published PDD, a renewable crediting period of 7 years has been chosen.		**OK**
D. Environmental Impact						
	Has an analysis of the environment impacts of the project activity been undertaken? Is it clearly and sufficiently described in the PDD?	/1//17/	DR	The environmental aspects of the project activity were analyzed by the Ministry of Environmental Housing and Territorial Development, which is authority competent to issue the licenses for the project activity.		**OK**
	Is the analysis of the environmental impacts	/1//16//	DR	Yes, the EIA /16/is required by the Ministry of		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
	required by the legislation of the host Country? If yes, has the EIA has been approved by local Government? Does the approval contain any conditions that need monitoring?	17/		Environment Housing and Territorial Development. The Resolution 0206 of 2009 /17/, granted the pertinent environmental license for the project activity. The PDD version 1 describes the environmental impacts and its monitoring, compensation or restoration activity. PP shall specify/ make clear in the PDD the programs that are additional to the ones required by the environmental agency.	~~CL16~~	
	Is it the project in line with the current environmental legislation in the host Country?	/1//16//17/	DR	The project activity has the applicable environmental license. PP shall provide the applicable semi-annual environmental reports presented to the environmental agency, as per the requirements of the Environmental Management Plan /16/.	~~CL17~~	**OK**
E. Local stakeholder consultation						
	Were the local stakeholders invited by the PP prior to the publication of the PDD in the UNFCCC website?	/1//24/	DR	The local stakeholder consultation was conducted in 05/10/2009, before the publication of the PDD in the UNFCCC web site.		**OK**
	Have relevant stakeholders been adequately consulted / invited for comments (addresses provided / available)?	/1//24/	DR/CC	Considering the area of Project influence, on 13/11/2009 a forum was held addressing Hydropower, Sustainable Development and was organized by the International Hydropower Association, ISAGEN S.A E.S.P., Fundación Natura – Colombia and PricewaterhouseCoopers – PwC. In this forum, ISAGEN S.A. E.S.P presented to the participants the Hydroelectric Sogamoso Project structure within the framework of Clean Development Mechanism (CDM). PP presented to RINA a letter from Setecsa, confirming that 280 invitations for the Forum were sent through the Companies Colombia		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				Express and Servicios Postales de Colombia 4_72. A list with the Persons name, position and Entity is provided along with the letter. Also, the invitation to the forum was published in a local press and ISAGEN web site /24/. Moreover, PP provided a list signed by the local stakeholders that participated in the Forum, held in Bucaramanga, on 13/11/2009. The list contains the name, position, entity, telephone, email, address and city of the stakeholders. Representatives of government entities, environmental authorities, private companies, mixed companies (public and private), local media, non-governmental, associations, corporations, foundations and cooperatives were present in the Forum.		
	Is the summary of the comments received from the stakeholders provided in the PDD (provided / available)?	/1//24/	DR/CC	PP provided the formularies used by stakeholders to raise their questions during the forum /24/. The list of the questions discussed during the Forum, with PP answers, is presented (summary) in the PDD (E.2).		**OK**
	Has due account been taken by the project participants of any stakeholder comments received?	/1//24/	DR/CC	Yes, see section E.1.3.		**OK**
	If a stakeholder consultation process is required by regulations/laws in the host Country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1//24//46/	DR/CC	Colombia does not have a local law regarding the local stakeholder consultation. PP provided to RINA pictures of the Forum and the presentations from International Hydropower Association, Fundación Natura, and PricewaterhouseCoopers – PwC /24/. Moreover, during site visit, RINA had the opportunity to interview Mr. Leonardo Ardilla, from CEN – UNAB, involved in the Employment program and three representatives of different communities affected by the project activity: Mr. Juan Tercero - Community leader- Ciniega El		**OK**

Checklist Question		Ref.	MoV1	Comments	Draft Conclusion	Final Conclusion
				Llanito Fishermans community (Barrancabermeja municipality), Mr. Antonio Joia Caballero - Community leader- Casa de Barro community (Betulia municipality), Mrs. Esperanza Gil - Community leader Plazuela community (Zapatoca municipality). It was possible to confirm that the local stakeholder consultation was adequately conducted and that the local community leaders showed a good knowledge of the project activity and no major concerns were raised. In the PDD version 1 it is mentioned that "Sogamoso Hydroelectric Project, owned by ISAGEN which is an environmentally and socially responsible Company, complies and incorporates strategic principles, criteria and guidelines established by the World Commission on Dams about policies and corporate expressions of social responsibility". PP shall clarify or provide evidences of the compliance with WCD criteria's.	~~CL1~~	