

Gold Standard Passport

CONTENTS



- A. Project title
- B. Project description
- C. Proof of project eligibility
- D. Unique Project Identification
- E. Outcome stakeholder consultation process
- F. Outcome sustainability assessment
- G. Sustainability monitoring plan



- H. Additionality and conservativeness deviations



Annex 1 ODA declarations

SECTION A. Project Title

Blue Fire Bio Wastewater treatment and biogas utilization project

SECTION B. Project description

The proposed project entails the installation of two upflow anaerobic sludge blanket technology (UASB) biogas reactors and up to 3.128MW_{el} gas engines¹ at an existing starch factory in Thailand for:

- a) the extraction of methane (biogas) from the wastewater stream through the biogas reactors;
- b) the reuse of biogas as fuel in existing thermal boiler within the plant for starch drying; and
- c) the reuse of biogas as fuel for power generation.

The proposed project is implemented by Blue Fire Bio Co.,Ltd at the Chaodee Starch (2004) facility in the northeast of Thailand with a total wastewater flow-rate of 5,780m³/day and an average COD concentration of 12,000 mg/l.

Prior to the implementation of the project, the wastewater was treated by an open lagoon system, consisting of six anaerobic ponds all with a depth of over 4 meters. After the lagoons, the wastewater was re-used for starch cleaning. There was no discharge. Heavy fuel oil was used in boiler for heating purposes and electricity was provided by the grid.

In phase I, the project introduces successively two new sets of biogas reactors with methane capture and utilisation for energy purposes. The first reactor will be introduced into the existing open anaerobic lagoon based wastewater treatment system. As the starch factory plans to expand its starch production with the construction of a second line similar to the existing one, another biogas reactor will be then introduced; and the lagoon system will be extended to 15 lagoons (Phase II). As a consequence of the new anaerobic reactors, the organic load entering the lagoon system is drastically reduced because most of the organic matter is converted to biogas in the reactor. The project activity avoids the release of methane into the atmosphere, which would occur due to the anaerobic digestion of the organic content in the open lagoon based wastewater treatment system (anaerobic conditions, leading to methane generation within the lagoon are the result of a lagoon depth greater than 2-4m and an average atmospheric temperature of about 28°C)².

In addition, the biogas reactors produce sufficient quantities of biogas to fuel thermal oil boilers for starch drying, replacing partly the use of heavy fuel oil, and to fuel a gas engine for the production of power for both in-house use and/or sale to the electricity grid. For phase I, existing boiler will be used and a new boiler will be installed for Phase II.

Up to 1,994 tons/year of heavy fuel oil are replaced for heating purposes, and up to 5,794MWh are generated annually with the biogas generators. A first 1.128MW_{el} biogas gensets will be installed in 2009, and the second one with a capacity up to 2 MW_{el} is planned to be installed one year later. The replacement of heavy fuel oil in the thermal oil boilers, the replacement of diesel from the generators and displacement of electricity from the national grid, which is generated by fossil fuel fired power plants from the Thai national grid to a large extent, will lead to further reductions of greenhouse gases.

¹ The exact total capacity of the gas engines is not yet decided.

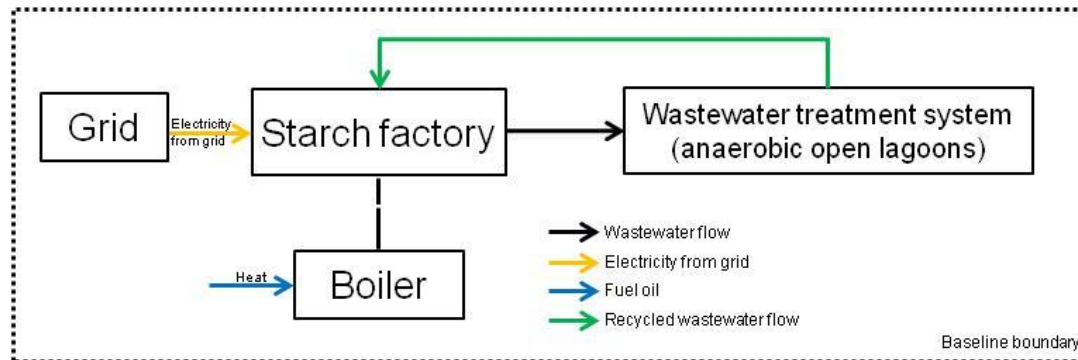
² As per published source Pollution control Department, Thailand.
http://www.pcd.go.th/info_serv/water_wt.html

In accordance with the project owner plans, the electricity generated will be sold to PEA³ under a firm power purchase agreement under the Very Small Power Producer⁴ (VSPP) program.

The average estimated emission reduction is 51,817 tonnes per year of CO₂ equivalent.

The diagrams of the pre and post project situations are demonstrated below,

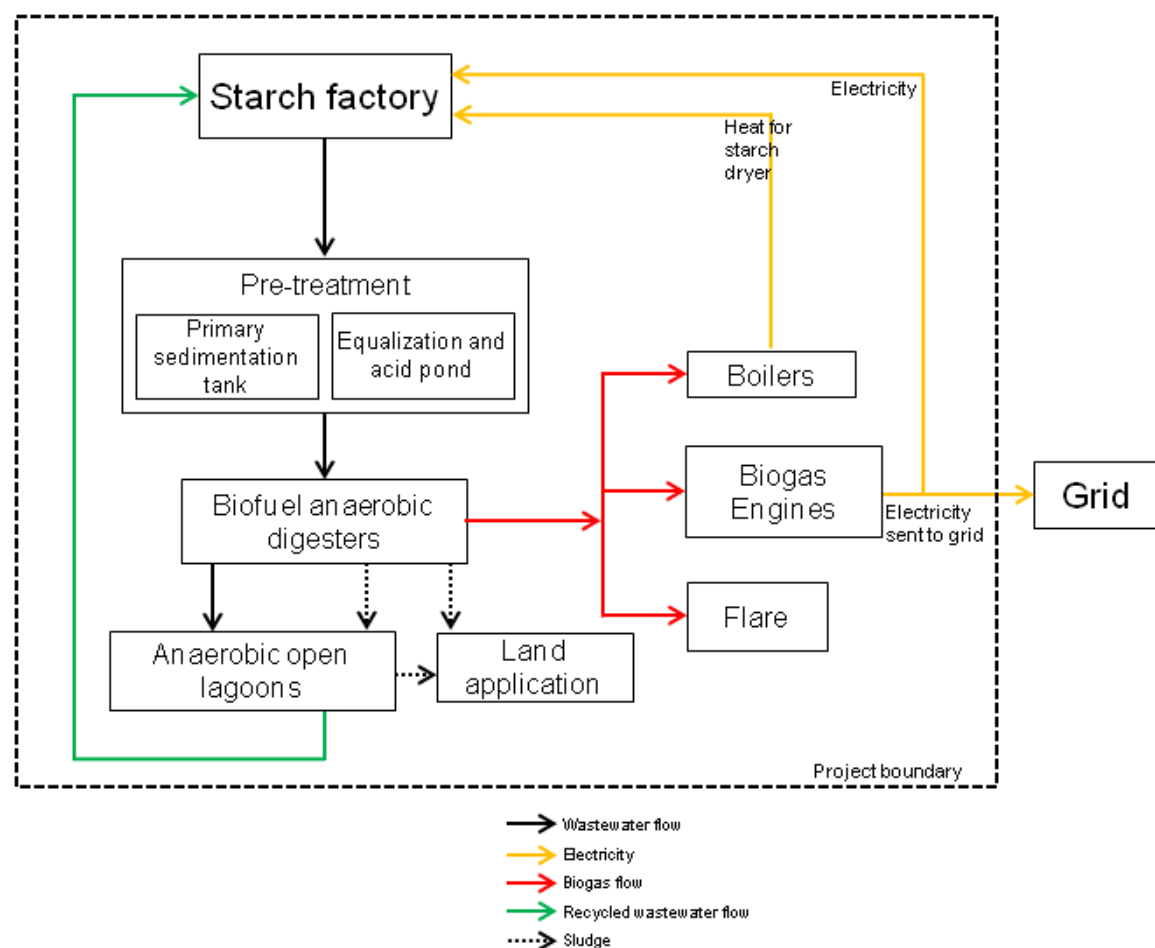
Pre-project situation (baseline)



³ The Provincial Electricity Authority is a government enterprise under the Ministry of Interior. The authority's responsibility is primarily concerned with the generation, distribution, sales and provision of electric energy services to the business and industrial sectors as well as to the general public in provincial areas, with the exception of Bangkok, Nonthaburi and Samut Prakran provinces.

⁴ A Very Small Power Producer (VSPP) can be any private entity, government or state-owned enterprise that generates electricity either (a) from non-conventional sources such as wind, solar and mini-hydro energy or fuels such as waste, residues or biomass, or (b) from conventional sources provided they also produce steam through cogeneration. As per the VSPP program, the VSPP is limited to sell no more than 10MW of its electrical power output to the designated distribution utility, such as Metropolitan Electricity Authority (MEA) and/or Provincial Electricity Authority (PEA).

Post-project situation (project activity)



Sustainable Development Benefits are discussed in detail in section F of the GS passport.

SECTION C. Proof of project eligibility

C.1. Scale of the Project

Project Type	Large	Small
	☐	☒
	☐	☐
	☐	☐
	☐	☐

	☐	☐
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	☐
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C.2. Host Country

Thailand

C.3. Project Type

Project type	Yes	No
Does your project activity classify as a Renewable Energy project?	☒	☐
Does your project activity classify as an End-use Energy Efficiency Improvement project?	☐	☒

The project type falls under Biogas (landfill gas and biogas from agro-processing, wastewater and other residues), as specified in Appendix C of the Gold Standard Toolkit.

Adherence to the 65% rule of minimum utilisation

The biogas system at the project activity is designed in such a way to maximise the utilisation ratio of the biogas for the delivery of thermal and electrical energy. The quantity of biogas is expected to be 7,575,000 Nm³. 60% is used as fuel in an existing thermal oil boiler and 40% is used as fuel in power generator. The flaring system will be used only in case of emergency.

Pre Announcement	Yes	No
Was your project previously announced?	☐	☒

Explain your statement on pre announcement

There has been no public announcement of the project going ahead without the CDM, prior to any payment being made for the implementation of the project.

*the table refers to the PDD

Date	Event	Verified information and evidence submitted by PP
2004	Operation start of the starch factory	Production data
25 January 2005	Consideration of the CDM to develop WWT treatment system = proof of early consideration	Board minutes
May 2005	First technical proposal on biogas project	Proposal
4 and 6 May 2005	Communication with the Energy for	Fax from E for E and letter

	Environment Foundation (E for E), an independent not-for-profit organization about CDM	from Chaodee to E for E
June 2005	E for E proposal for a biofuel reactor	Proposal
8 August 2005	Decision by Chaodee Starch factory to invest in a new wastewater treatment system = investment decision date	Board minutes
20 August 2005	Biofuel Co. Ltd (BFR) proposal (requested as alternative to E for E proposal)	Proposal
15 October 2005	Contract between Blue Fire Bio Co., Ltd (BFB) and carbon consultants for CDM services	Contract
26 October 2005	Acceptance of BFR proposal by BFB for the construction of an anaerobic biofuel reactor = CDM Project Start date	Contract
11 November 2005	First invoice to BFR for the biodigester design work	Invoice
May 2006	Physical construction start of the first line of the anaerobic digester	Purchase orders
30 January 2007	Thai cabinet approves first batch of seven projects, ending an interminable period of waiting	GTZ newsletter – January 2007
10 May 2007	Communication from consultant stating the difficulties to implement CDM project in Thailand	Letter from consultant to BFB
25 May 2007	CDM cooperation agreement between South Pole and the carbon consultant, whereas South Pole was supposed to support CDM project implementation and purchase CERs.	Cooperation agreement
06 July 2007	Thailand Greenhouse Gas Management Organization (TGO) was established with a view to take over approval process from cabinet	
July 2007	Operation start of the 1st line	Monitoring report
18 December 2007	ERPA signed between BFB and South Pole	ERPA
August 2008	Investment for the second line	Contract between BFB – Bio Forerunner (BioFuel has established a new company)
25 September 2008	South Pole requested TUV Rheinland proposal for validation	Email
10 November 2008	Initial CDM Gold Standard stakeholder consultation at Chaodee factory	Stakeholder consultation documents
20 November 2008	Finishing Initial Environmental Evaluation and draft PDD	IEE and draft PDD
28 November 2008	Submission of the Letter of Approval (LoA) request to Thai DNA (Host)	LoA request
7 February 2009	PDD webhosted on UNFCCC	UNFCCC website
20 August 2009	Letter of Approval issued by Thai DNA	Thai LoA. Nr. B.E. 2552

		(2009)
28 September 2009	Letter of Approval issued by Switzerland	LoA Swiss G 514-3487
May 2010	Expected start operation date of the second line (postponed)	BFB schedule

C.4. Greenhouse gas

Greenhouse Gas	
Carbon dioxide	☒
Methane	☒
Nitrous oxide	☐

C.5. Project Registration Type

Project Registration Type	
Regular	☐

Pre-feasibility assessment	Retro-active projects (T.2.5.1)	Preliminary evaluation (T.2.5.2)	Rejected by UNFCCC (T2.5.3)
	☒	☐	☐

SECTION D Unique project identification

D.1. GPS-coordinates of project location

	Coordinates
Latitude	15.1303N
Longitude	101.5586E.



Explain given coordinates

N/A

D.2. Map

61 Moo 14, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat), Thailand



SECTION E. Outcome stakeholder consultations process

E.1. Assessment of stakeholder comments

Stakeholder Consultation Meeting

The consultation has been conducted by the project owner Blue Fire Bio Co.,Ltd, with assistance from South Pole Carbon Asset Management Limited (Switzerland based company in charge of CDM project development) and BFR Co Ltd. (Thai engineering company responsible for the implementation of the wastewater treatment plant).

The meeting was held at the facilities of the Chaodee Starch factory which is located 400m away from the wastewater treatment plant, on November 10, 2008.

Here below, we summarise the open questions from the first meeting and assessed their relevance:

Stakeholder Comment	Assessment	Response to comment
Carbon dioxide gas effect on the environment	This question seems to be mainly informative, though	Methane gas is avoided thanks to the project activity,

	stakeholders also seem to seek guarantees with regard to the safety of the plant's activities.	which contributes to improving the environment.
Origin of the wastewater	This question was mainly informative.	A response was provided during the consultation.
Safety of the system	Stakeholders are rightly concerned by the safety of an installation located in their neighbourhood.	The system has already proved to be safe under proper handling conditions, which will be ensured in this project activity.

For the minutes of the meeting and other details regarding the consultation meeting, please refer to the Stakeholder Consultation report.

E.2. Stakeholder Feedback Round

Please describe report how the feedback round was organised, what the outcomes were and how you followed up on the feedback.

The SFR meeting was done in accordance to the GS requirements stated in the Toolkit as well as to the GS Pre-feasibility assessment.

The SFR meeting was done on Friday 12th November 2010 at the project location, the meeting room of Chaodee Starch (2004) 98, Moo 14, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat), Thailand.

The details of the SFR meeting are as below,

1. Design of the Stakeholder Consultation Process

1.1 Agenda⁵

- Explanation of the objective of the meeting
- Explanation of the project details and progress
- Blind sustainable development exercise and Do-no-harm discussion
- Open for comments from the stakeholders, including any mitigation actions or monitoring plan, if any

The (Thai) agenda was attached to the invitation letter to the stakeholders.

1.2 Non-technical Summary

The non-technical summary was in Thai and was attached to the invitation letter to the stakeholders. The English text below demonstrates the content of the non-technical summary.

Non Technical Summary of "Blue Fire Bio Wastewater Treatment and Biogas Utilization Project"

Project detail

The "Blue Fire Bio Wastewater Treatment and Biogas Utilization Project" of Blue Fire Bio Co., Ltd is a project which implements a waste water treatment system which can produce biogas and reduce environmental impacts. The waste water is from a starch manufacturing plant of Chaodee Starch (2004). The biogas can be used to produce heat in the boiler and to produce electricity to the local grid. The project is located at 61, Moo 14, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat).

Before the project activity, the waste water was treated in the open lagoon system, which caused environmental impacts

⁵ Agenda in Thai used for the invitation is available for the validation

e.g. odour. Therefore, the project owner has decided to develop this project through Clean Development Mechanism (CDM).

Technology used to treat the waste water and produce biogas

The biogas production system will use a high efficiency waste water treatment system by Bio Fuel Co., Ltd. The gas from the system can be used as fuel to substitute fuel oil previously used for starch production process as well as to produce electricity. The project has several advantages,

- By displacing fossil-fuel electricity from the grid, the project will achieve Green house gas emission reductions and thus participate to the mitigation of climate change.
- The biogas can be used as fuel
- The higher efficiency will result in less time for water treatment process
- Reliable technology

Project timeline

Progress	
start of the project – when the decision was made	August 2005
construction of phase 1	May 2006
operation of phase 1	July 2007
First stakeholder consultation meeting	Nov 2008
construction of phase 2	Sept 2009
operation of phase 2	September 2010
second stakeholder consultation meeting	Nov 2010



เอกสารสรุปการดำเนินงานโครงการผลิตก๊าซชีวภาพจากน้ำเสียและการนำก๊าซชีวภาพไปใช้ประโยชน์ของ

บริษัท บลู ไฟร์ ไบโอ จำกัด

รายละเอียดของโครงการ

โครงการผลิตก๊าซชีวภาพจากน้ำเสียและการนำก๊าซชีวภาพไปใช้ประโยชน์ของบริษัท บลู ไฟร์ ไบโอ จำกัด มีจุดประสงค์เพื่อบำบัดน้ำเสียในระบบบำบัดที่เป็นระบบปิด ซึ่งเป็นการลดผลกระทบสิ่งแวดล้อม อาทิเช่น ปัญหากลิ่นเหม็น และนอกจากนี้ทางโครงการจะสามารถใช้ประโยชน์จากก๊าซชีวภาพที่เป็นผลพลอยได้จากการบำบัดน้ำเสียในระบบปิดดังกล่าว โดยนำเอาน้ำหมักเป็นน้ำเสียที่เกิดจากขั้นตอนการผลิตเป็นน้ำสำหรับใช้รดน้ำต้นไม้ และน้ำเสียที่เหลือใช้รดน้ำต้นไม้ได้อีก 1,000 ลิตรต่อวัน (2004) จำกัด โดยก๊าซชีวภาพสามารถนำไปใช้เป็นเชื้อเพลิงทดแทนการใช้แก๊สธรรมชาติที่มีต้นทุนสูงในโรงงานแปรรูปและอีกส่วนหนึ่งจะถูกนำไปใช้ในการผลิตไฟฟ้าสำหรับใช้ภายในโรงงานโครงการตั้งอยู่เลขที่ 61 หมู่ 14 ตำบลหินลาด อำเภอคำชะอี จังหวัดนครราชสีมา

ก่อนการดำเนินโครงการ มีการนำน้ำเสียจากกระบวนการผลิตเบียร์มาบำบัดด้วยระบบบำบัดน้ำเสียแบบบ่อเปิด แม้ว่าระบบดังกล่าวสามารถบำบัดน้ำเสียให้มีคุณภาพเป็นที่ยอมรับได้ตามมาตรฐาน แต่การนำบ่อดังกล่าวมาทำให้อาจเกิดปัญหากลิ่นเหม็นต่างๆ ตัวอย่างเช่น ปัญหากลิ่นเหม็น อันจะทำให้เกิดความเสี่ยงต่อสุขภาพและสิ่งแวดล้อมของชุมชนที่อยู่ใกล้เคียงโรงงาน อีกทั้งยังไม่ได้มีการปล่อยน้ำที่ผ่านการบำบัดสู่แหล่งน้ำธรรมชาติในบริเวณนั้นๆ สาเหตุดังกล่าวจึงเป็นเหตุผลของโครงการพัฒนาโครงการนี้โดยผ่านกลไกการพัฒนาที่สะอาด (Clean Development Mechanism : CDM)

เทคโนโลยีที่ใช้ในการบำบัดน้ำเสีย เพื่อผลิตก๊าซชีวภาพ

ระบบผลิตก๊าซชีวภาพที่โครงการ ใช้เป็นบ่อหมักก๊าซชีวภาพชนิดหนึ่งที่มีประสิทธิภาพสูงซึ่งได้รับการพัฒนาระบบให้มีความเหมาะสมมากยิ่งขึ้น โดย บริษัท ไบโอฟูเอล จำกัด มีขั้นตอนการย่อยสลายโดยการใส่แบคทีเรียที่มีอยู่ในธรรมชาติ ซึ่งทำให้เกิดขึ้นจากการย่อยสลายนั้นจะเป็นเชื้อเพลิงเพื่อทดแทนน้ำหมักในกระบวนการผลิตเบียร์มาบำบัด และนำไปใช้ในการผลิตกระแสไฟฟ้า เพื่อลดการนำเข้าไฟฟ้าจากการไฟฟ้าส่วนภูมิภาค

ระบบบำบัดน้ำเสียแบบนี้มีข้อดีหลายประการ ได้แก่

- การลดการปล่อยก๊าซเรือนกระจกออกสู่ชั้นบรรยากาศ เพื่อช่วยแก้ไขปัญหาลูกโลกร้อน
- การนำก๊าซชีวภาพ ไปใช้ประโยชน์ต่างๆ ในด้านเชื้อเพลิง
- การใช้ระยะเวลาในการบำบัดน้อยกว่า เนื่องจากกระบวนการย่อยสลายที่มีประสิทธิภาพ
- เป็นเทคโนโลยีที่ได้รับการยอมรับและมีความน่าเชื่อถือ

สรุปขั้นตอนและความสำเร็จในการดำเนินงาน

การดำเนินงาน	
การตัดสินใจก่อสร้างระบบผลิตก๊าซชีวภาพ พร้อมทั้งดำเนินการพัฒนาโครงการลดผลกระทบที่สะอาด	สิงหาคม 2548
เริ่มก่อสร้างระบบผลิตก๊าซชีวภาพ 1	พฤษภาคม 2549
ก่อสร้างระบบผลิตก๊าซชีวภาพ 1 แล้วเสร็จ และเริ่มเดินระบบ	กรกฎาคม 2550
การจัดประชาพิจารณ์ครั้งที่ 1	พฤศจิกายน 2551
เริ่มก่อสร้างระบบผลิตก๊าซชีวภาพ 2	กันยายน 2552
ก่อสร้างระบบผลิตก๊าซชีวภาพ 2 แล้วเสร็จ และเริ่มเดินระบบ	กรกฎาคม 2553
การจัดประชาพิจารณ์ครั้งที่ 2	พฤศจิกายน 2553

1.3 Invitation Tracking Table

The invitation list (in the format of invitation tracking table) includes all the categories suggested in the GS Toolkit. The individuals and organizations invited are local people in e.g. Hin Dad district, Ta Kean district and Huay Bong district, as they are stakeholders who can be affected from the project rather than people from the other districts. The stakeholders were invited at least 2 weeks before the meeting day. The villagers were invited through head of villages. The stakeholders invited for the previous stakeholder consultation meeting were also included in the invitation for this SFR.

Category code	<u>Organisation</u>	<u>Name of Invitee</u>	<u>Way of invitation</u>	<u>Date of invitation</u>	<u>Confirmation received?</u> <u>Y/N</u>
A	villagers of Hindad district	Head of Hindad district	In person	18-10-2010	Y
A	villagers of Huay Bong district	Head of Huay Bong district	In person	18-10-2010	Y
A	villagers of Ta Kean district	Head of Ta Kean district	In person	18-10-2010	Y
A	villagers of Hindad district	Assistant of Head of Hindad district	In person	18-10-2010	Y
A	villagers of Huay Bong district	Assistant of Head of Huay Bong district	In person	18-10-2010	Y
A	villagers of Ta Kean district	Assistant of Head of Ta Kean district	In person	18-10-2010	Y
A	villagers of Moo 2 Huay Bong district	Head of of Moo 2 village	In person	18-10-2010	Y
A	villagers of Moo 3 Huay Bong district	Head of Moo 3 village	In person	18-10-2010	Y
A	villagers of Moo 20 Huay Bong district	Head of Moo 20 village	In person	18-10-2010	Y
A	villagers of Moo 17 Huay Bong district	Head of Moo 17 village	In person	18-10-2010	Y
A	villagers of Moo 4 Hin Dad district	Head of Moo 4 village	In person	18-10-2010	Y
A	villagers of Moo 14 Hin Dad district	Head of Moo 14 village	In person	18-10-2010	Y
A	villagers of Moo 22 Hin Dad district	Head of Moo 22 village	In person	18-10-2010	Y
A	villagers of Moo 2 Hin Dad district	Head of Moo 2 village	In person	18-10-2010	Y
A	villagers of Moo 15 Hin Dad district	Head of Moo 15 village	In person	18-10-2010	Y
A	villagers of Moo 3 Hin Dad district	Head of Moo 3 village	In person	18-10-2010	Y
A	villagers of Moo 15 Huay Bong district	Head of Moo 15 village	In person	18-10-2010	Y
B	Police Office of Hin Dad district	Cheif Officer of Police Office of Hin dad district	In person	18-10-2010	Y

B	Office of the Dan Khun Tod Municipality	Chief Officer of Office of the Dan Khun Tod Municipality	In person	18-10-2010	Y
B	Hin Dad Subdistrict Administrative Organization	Chief Officer of Hin Dad Subdistrict Administrative Organization	In person	18-10-2010	Y
B	Huay Bong Subdistrict Administrative Organization	Chief Officer of Huay Bong Subdistrict Administrative Organization	In person	18-10-2010	Y
B	Ta Kean Subdistrict Administrative Organization	Chief Officer of Ta Kean Subdistrict Administrative Organization	In person	18-10-2010	Y
B	Suranaree University of Technology (Nakhon Ratchasima)	To whom it may concern	Letter	18-10-2010	Y
B	Khon Kaen University	To whom it may concern	Letter	18-10-2010	Y
B	Chulalongkorn University	To whom it may concern	Letter	18-10-2010	Y
B	Mahidol University	To whom it may concern	Letter	18-10-2010	Y
B	King Mongkut's University of Technology Thonburi	To whom it may concern	Letter	18-10-2010	Y
B	Office of Natural Resources and Environmental Policy and Planning	Director	Letter	18-10-2010	Y
B	Nakhon Ratchasima Provincial Public Health Office	Chief Officer of Nakhon Ratchasima Provincial Public Health Office	Letter	18-10-2010	Y
B	Regional Energy Coordination Office	Chief Officer of Regional Energy Coordination Office	Letter	18-10-2010	Y
B	Nakhon Ratchasima Provincial Agriculture Extension Office	Chief Officer of Nakhon Ratchasima Provincial Agriculture Extension Office	Letter	18-10-2010	Y
B	Nakhon Ratchasima Provincial Administrative Office	Chief Officer of Nakhon Ratchasima Provincial Administrative Office	Letter	18-10-2010	Y
B	Nakhon Ratchasima Provincial Industrial Office	Chief Officer of Nakhon Ratchasima Provincial Industrial Office	Letter	18-10-2010	Y
B	Nakhon Ratchasima Provincial Office of Natural Resources and Environment	Director	Letter	18-10-2010	Y
B	National Science and Technology Development Agency - NSTDA	To whom it may concern	Letter	18-10-2010	Y

B	Ministry of Agriculture and Cooperatives	To whom it may concern	Letter	18-10-2010	Y
B	International Institute for Energy Conservation (IIEC)	To whom it may concern	Letter	18-10-2010	Y
B	Thailand Development Research Institute (TDRI)	To whom it may concern	Letter	18-10-2010	Y
B	Environmental Engineering Association of Thailand - EEAT	To whom it may concern	Letter	18-10-2010	Y
B	Provincial Electricity Authority of Dan Khun Tot district	To whom it may concern	Letter	18-10-2010	Y
C	Thailand Greenhouse Gas Management Organization-TGO	Director	Letter	18-10-2010	Y
D	Greenleaf Foundation	Director	Letter	18-10-2010	Y
D	Energy of Environment Foundation	Director	Letter	18-10-2010	Y
D	The Energy Conservation Foundation of Thailand	Director	Letter	18-10-2010	Y
D	Thailand Environment Institute	Director	Letter	18-10-2010	Y
D, F	World Wildlife Fund	Director	Letter	18-10-2010	Y
D, F	Greenpeace - Thailand office	Director	Letter	18-10-2010	Y
E	Gold Standard	Ellen May Zanoria, South East Asia Regional Manager	email	29-10-2010	Y
F	Greenpeace International	To whom it may concern	email	29-10-2010	Y
F	HELIO International	Helene O'Connor-Lajambe	email	29-10-2010	Y
F	Mercy Corps	Dorothy McIntosh	email	29-10-2010	Y
F	REEEP	Marianne Osterkorn	email	29-10-2010	Y
F	WWF International	Bella Roscher	email	29-10-2010	Y
F	Appropriate Technology Association (ATA)	Chalernsri Dhamabutra or Poonsae Suanmuang	Letter	18-10-2010	Y
F	Dhammanart Foundation	Khun Songklod Indhukarn	email	29-10-2010	Y
F	Renewable Energy Institute of Thailand, REIT	Ms. Wanun Permpibul	Letter	18-10-2010	Y

1.4 Text of individual invitations

The English text below demonstrates the content of individual invitation letter sent by post and in person.

Date: 18 October 2010

Topic: Invitation to a stakeholder meeting of Blue Fire Bio Co.,Ltd
Blue Fire Bio Wastewater Treatment and Biogas Utilization Project

To.....

Attachment: (agenda, confirmation form and non-technical summary)

As Blue Fire Bio Co.,Ltd has introduced anaerobic wastewater treatment under Clean Development Mechanism which can help reducing greenhouse gas emission which leads to global warming and environmental issues.

The company, in association with South Pole Carbon; therefore, is organizing a meeting to update on the project progress and obtain stakeholder's comments on the project on 12 November 2010 from 1 pm at the meeting room of Chaodee Starch (2004) Company Limited, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat), Thailand.

The company realizes the importance of people in the surrounding communities and relevant organizations and would like to invite you to attend the meeting on the date and venue.

Yours faithfully,

Mr. Chanchai Chaodee
Blue Fire Bio Co.,Ltd
18 October 2010



บริษัท บลูไฟร์ ไบโอบีโอ จำกัด BLUE FIRE BIO CO., LTD.
เลขที่ 61-61/ก หมู่ 14 ต.หินลาด อ.คำชะอี จ.มุกดาหาร 58216

วันที่ 18 ตุลาคม 2553

เรื่อง ขอเรียนเชิญเข้าร่วมสัมมนาเพื่อประชาสัมพันธ์ความคืบหน้าและรับฟังความคิดเห็น
โครงการผลิตก๊าซชีวภาพจากน้ำเสียและการนำก๊าซชีวภาพไปใช้ประโยชน์ของบริษัท บลูไฟร์ ไบโอบีโอ จำกัด

เรียน ผอ.ป๋วยไพฑูริย์ ม. 3 ต.หินลาด

สิ่งที่ส่งมาด้วย กำหนดการและแบบตอบรับ

เนื่องจากบริษัท บลูไฟร์ ไบโอบีโอ จำกัด ได้คิดค้นระบบบำบัดน้ำเสียแบบ Anaerobic Treatment ภายใต้โครงการ
กลไกพัฒนาที่สะอาด (CDM: Clean Development Mechanism) ซึ่งจะสามารถช่วยลดการปล่อยก๊าซเรือนกระจกขึ้นสู่ชั้น
บรรยากาศที่ก่อให้เกิดโลกร้อน อีกทั้งยังช่วยลดปัญหาสิ่งแวดล้อมอีกด้วย

บริษัท บลูไฟร์ ไบโอบีโอ จำกัด ในฐานะผู้ร่วมพัฒนาโครงการกลไกพัฒนาที่สะอาด (CDM) จึงได้จัดงาน
สัมมนาประชาสัมพันธ์ความคืบหน้าของโครงการและรับฟังความคิดเห็นในโครงการผลิตก๊าซชีวภาพและการใช้ประโยชน์
จากก๊าซชีวภาพที่ได้จากน้ำเสียเหลือทิ้งจากโรงงานแปรรูปมันสำปะหลัง บริษัท บลูไฟร์ ไบโอบีโอ จำกัด ในวันที่ 16 พฤศจิกายน
2553 เวลา 13.00 น. ณ ห้องประชุมใหญ่ บริษัท เชาวมณี สคาร์วี (2004) จำกัด อำเภอคำชะอี จ.มุกดาหาร

บริษัทตระหนักถึงความสำคัญของประชาชนที่อยู่ในชุมชนใกล้เคียงกับโครงการและหน่วยงานต่างๆที่เกี่ยวข้อง
จึงขอเรียนเชิญท่านเข้าร่วมงานสัมมนาในวัน และเวลาดังกล่าว

ขอแสดงความนับถือ

(นายชาญชัย เชาวมณี)

กรรมการผู้จัดการ บริษัท บลูไฟร์ ไบโอบีโอ จำกัด

18 ตุลาคม 2553

The English text below demonstrates the content of individual invitation letter sent by email (to e.g. GS supporter NGOs and the GS). The email contains both English and Thai content.

Dear all,

Blue Fire Bio Co.,Ltd and South Pole Carbon (Thailand) Co.,Ltd are inviting you to attend a Stakeholder Feedback Round (physical meeting) for "Blue Fire Bio Wastewater Treatment and Biogas Utilization Project". The proposed CDM project is going to apply for Gold Standard and the meeting is to provide and update about project's progress and to obtain opinions from relevant stakeholders and surrounding communities.

To be fully in line with the GS rules and regulations we would like to invite the Gold Standard, local Gold Standard Supporters, NGOs and relevant organizations to participate in the Stakeholder Consultation Meeting. Per local invitees' request, this meeting will be scheduled on 12th November 2010, from 1-4 pm at the meeting room of Chaodee Starch (2004) Company Limited, 98 Moo 14, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat), Thailand.

Please find the attached agenda and non-technical summary of the project (in English and Thai)

In case you could not attend the meeting and would like to provide opinions about the project or if you have any questions, please feel free to do so by replying back to this email.

Best regards,

Sara (Sasithorn K.)
Gold Standard Project Manager

South Pole Carbon (Thailand) Co.,Ltd.
Bangkok office

T +66 2 678 8979
E s.kittithumkul@southpolecarbon.com
W <http://www.southpolecarbon.com>

1.5 Text of public invitations

As Blue Fire Bio Co.,Ltd has introduced anaerobic wastewater treatment under Clean Development Mechanism which can help reducing greenhouse gas emission which leads to global warming and environmental issues.

The company, in association with South Pole Carbon; therefore, is organizing a meeting to update on the project progress and obtain stakeholder's comments on the project on 12 November 2010 from 1 pm at the meeting room of Chaodee Starch (2004) Company Limited, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat), Thailand.

The company realizes the importance of people in the surrounding communities and relevant organizations and would like to invite you to attend the meeting on the date and venue.

12 November 2010 from 1 pm
The meeting room of Chaodee Starch (2004) Company Limited

If you have any questions or would like to put comments on the project, please feel free to contact,
Blue Fire Bio Co.,Ltd
61-61/1 Moo 14, Hindad, Dan Khun Tot District, Nakhorn Ratchasima Tel: 044-331-231-3 (K.Ratchaneekorn)

Example of public invitation



บริษัท บลู ไฟร์ ไบโอ ได้ติดตั้งระบบบำบัดน้ำเสียแบบ Anaerobic Treatment ภายใต้โครงการเพื่อกลไกการพัฒนาที่สะอาด (CDM: Clean Development Mechanism) ซึ่งจะ
สามารถช่วยลดการปล่อยก๊าซมีเทนขึ้นสู่ชั้นบรรยากาศที่ทำให้โลกร้อนและลดปัญหา
สิ่งแวดล้อม

ทางบริษัท จึงได้จัดงานสัมมนาประชาสัมพันธ์ความคืบหน้าของโครงการและรับฟังความ
คิดเห็นเกี่ยวกับโครงการผลิตก๊าซชีวภาพและการใช้ประโยชน์จากก๊าซชีวภาพที่
ได้จากน้ำเสียเหลือทิ้งจากโรงงานผลิตแป้งมันสำปะหลังในวันที่ 12 พฤศจิกายน 2553
เวลา 13.00 น. ณ ห้องประชุม บริษัท เซาว์นดี สตาร์ช (2004) จำกัด

บริษัท บลู ไฟร์ ไบโอ จำกัด ตระหนักถึงความสำคัญของประชาชนที่อยู่ในชุมชน
ใกล้เคียงกับโครงการ จึงมีความยินดีขอเรียนเชิญทุกท่านที่สนใจเข้าร่วมฟังการ
ประชาสัมพันธ์และแสดงความคิดเห็นเกี่ยวกับโครงการ ตามวันและเวลาดังกล่าว

12 พฤศจิกายน 2553 เวลา 13.00 น.

ณ ห้องประชุม บริษัท เซาว์นดี สตาร์ช (2004) จำกัด

หากท่านมีคำถามหรือต้องการให้ความเห็นเกี่ยวกับโครงการ กรุณาติดต่อได้ที่

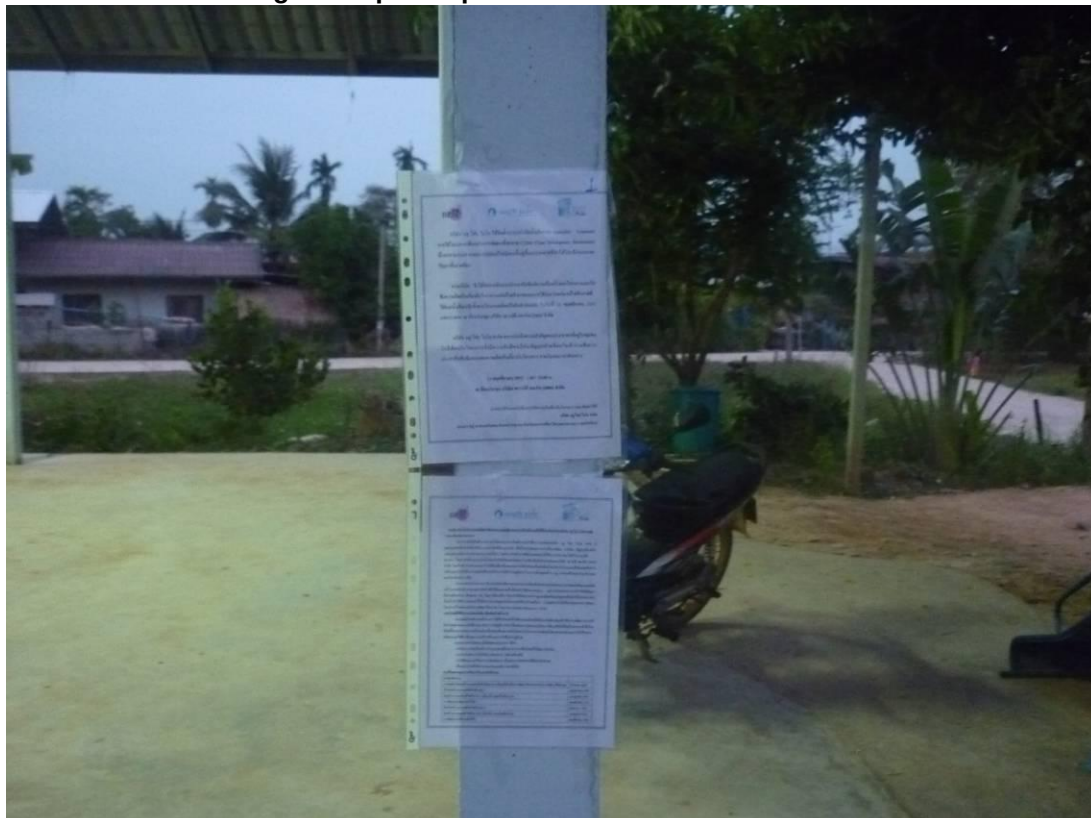
บริษัท บลู ไฟร์ ไบโอ จำกัด

61-61/1 หมู่ 14 ตำบลกีนดาบ อำเภอด่านขุนทด จังหวัดนครราชสีมา โทร 044-331-231-3 (คุณรัชฎีกร)

Pictures showing about public invitation at Moo 14 village notice board



Public invitation at a general public place



Moreover, there was also radio announcement at surrounding villages for public invitation.

2. Consultation process

2.1 Participants in the physical meeting

2.1.1 List of participants

Participant List			
Date and time: 12 November 2010, 1-4 PM			
Location: the meeting room of Chaodee Starch (2004) Company Limited, Hindad, Dan Khun Tot District, Nakhorn Ratchasima (Korat)			
Organization	M/F	Name	Tel
Huay Bong Subdistrict Administrative Organization	M	Onsaa Thaitae	089-9482318
Representative from Moo 2	M	Sompet Noinatao	085-7806977
Representative of villagers in Moo 20	M	Pornpipat Srisomsan	085-7716427
Representative of villagers in Moo 3	M	Thongnak Phumikokrak	083-3727639
Representative from villagers in Moo 20	M	Thiem Mekkunthod	083-3653632
Nakhon Ratchasima Provincial Public Health Office	M	Chansak Supornpokee	081-7604237
Representative from villagers in Moo 14	M	Puam Dadjantuk	082-8743979
Representative from villagers in Moo 3	M	Surachai Purdnok	-
Local resident	M	Ratthapon Thathong	-
Local resident	M	Pratat Jurmkijlak	081-7093619
Representative from villagers in Moo 22	M	Tim Ketkunthod	086-2490253
Hin Dad district Police station	M	Kittipoj Saipudpong	087-0017128
Office of the Dan Khun Tod Municipality	F	Ranchaya Silanjam	044-389403
Dan Khuh Tot District Office	M	Wuttipong Mongkuntot	082-1259951
Department of Environmental Quality Promotion	M	Meesak Minlintavisamai	02-5771136
Representative from Moo 2 village	F	Ranjuan Tinkuntot	080-7387754
Hin Dad Subdistrict Administrative Organization	M	Natthapon Teapunluk	086-2534757
Local resident	M	Anek Srikumpan	089-0474886
Regional Energy Coordination Office	M	Wutthichai Tanpanich	081-7188870
Regional Energy Coordination Office	M	Theerawut Longsakulnee	080-1574055
Huay Bong Subdistrict Administrative Organization	M	Somkiet Tosungnern	081-9556027
Local resident	M	Sayan	086-2528550
Local resident	M	Sinla Deeantuk	083-3683319
Local resident	M	Sommai	086-0924706

2.1.2 Evaluation Forms

Summary of Comments

What is your impression of the meeting?	It is good and useful that the company organized the meeting.
What do you like about the project?	I would like to support the project, as it is good for the environment, e.g. reducing odour, create jobs for local people.
What do you not like about the project?	-

Registration form





แบบลงทะเบียนการประชุมเพื่อประชาสัมพันธ์ความคืบหน้าและรับฟังความคิดเห็น
โครงการผลิตก๊าซชีวภาพจากน้ำเสียและการนำก๊าซชีวภาพไปใช้ประโยชน์
บริษัท บลู ไฟร์ ไบโอ จำกัด

วันที่ 12 พฤศจิกายน 2553, เวลา 13.00 – 16.00
ณ ห้องประชุม บริษัท เซาว์ทโพลาร์ (2004) จำกัด
เลขที่ 98 หมู่ 14 ตำบลกันตาด อำเภอคำชะอี จังหวัด นครราชสีมา

	นาย,นาง, นางสาว (Initial)	ชื่อ-สกุล (name / surname)	หน่วยงาน (ถ้ามี) (organisation)	เบอร์โทรศัพท์ (address)	ลายเซ็น (signature)
1		นายอรรถ ทุยแก้ว	อ.ท. ทุยแก้ว	0899482318	
2		นางสาววิมล วัฒนศิริ	ว.ศ. ม.2 บึงฉลือ	0857806977	วิมล วัฒนศิริ
3	นาง	พริ้งพิกุล พิเศษสัน	พ.ญ. น.20	095-7416427	P. —
4	คุณ	อานันท์ จิตต์อนันต์	อ.อ. น.3	0933729639	
5	นาง	พริ้งพิกุล เมฆมณฑล	ผู้ช่วย ม.20	0833653632	10/11/53
6	นาง	วิมล วัฒนศิริ	อ.ท. น.	081-960429	วิมล วัฒนศิริ
7					



	นาย,นาง, นางสาว (Initial)	ชื่อ-สกุล (name / surname)	หน่วยงาน (ถ้ามี) (organisation)	เบอร์โทรศัพท์ (address)	ลายเซ็น (signature)
8	นาง	เฉลิม เกตคณิก	ชินวัฒน์	082-874399	ว. 11-2
9	นาง	สุวิทย์ วัฒนธนา	สุวิทย์		ส. 10-1
10	นาง	สุวิทย์ ทาทอง	BFN	081-6824399	สุวิทย์
11	นาง	ประทีป เสงี่ยมอน	สุวิทย์	0812093619	สุวิทย์
12	นาง	กิม เกตคณิก	ชินวัฒน์	0862490252	กิม
13	นาง	กิตติภรณ์ วัฒนธนา	ว. 11-2	087-001-7128	ว. 11-2
14	นาง	วิมล วัฒนธนา	ว. 11-2	089-389403	วิมล
15	นาง	สุวิทย์ วัฒนธนา	ว. 11-2	082-1259951	สุวิทย์
16	นาง	สุวิทย์ วัฒนธนา	ว. 11-2	02-577-1136	สุวิทย์
17					



	นาย,นาง, นางสาว (Initial)	ชื่อ-สกุล (name / surname)	หน่วยงาน (ถ้ามี) (organisation)	เบอร์โทรศัพท์ (address)	ลายเซ็น (signature)
18		นางสุวิทย์ วัฒนธนา	ว. 11-2	080-888854	ว. 11-2
19		นางสุวิทย์ วัฒนธนา	ว. 11-2	086-103478	ว. 11-2
20		นางสุวิทย์ วัฒนธนา	ว. 11-2	087-0474886	ว. 11-2
21		นางสุวิทย์ วัฒนธนา	ว. 11-2	081-7148470	ว. 11-2
22		นางสุวิทย์ วัฒนธนา	ว. 11-2	0801574055	ว. 11-2
23		นางสุวิทย์ วัฒนธนา	ว. 11-2	081-9556027	ว. 11-2
24					
25					
26					
27					
28					



	นาม, นาม, นามสกุล (Initial)	ชื่อ-สกุล (name / surname)	หน่วยงาน (ถ้ามี) (organisation)	เบอร์โทรศัพท์ (address)	ลายเซ็น (signature)
29		นางสาว(นางสาว) อัญมณี	บริษัท อัญมณี จำกัด	086-2528550	
30		นางสาว อัญมณี	น.อ. 2 จำกัด	083-3683319	
31		นางสาว อัญมณี	น.อ. 2	086-0924706	
32					
33					
34					
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37					
38					

Example of an evaluation form

แบบประเมินผลการประชุม

1. ท่านมีความคิดเห็นอย่างไรกับงานสัมมนา ในหัวข้อต่อไปนี้
เช่น ประชาชนให้ความสนใจมากน้อยแค่ไหน? ข้อมูลที่น่าสนใจมีประโยชน์หรือไม่? หรือสิ่งที่ท่านประทับใจจากการ
สัมมนาครั้งนี้ โปรดแสดงความคิดเห็นของท่านได้ที่ด้านล่าง

ขอชื่นชม แสงจันทร์ สว่างใจ ส่งปัสตอร์กับ โดมวี่ ธีระดี เนการวัฒน์โดมวี่ดี
ต่อ พี่เขยกับ น้องสาว ร้องกลอน ต่อ ปณณิ โคนาณพ: สันติวารณ หนองพะ

2. ท่านรู้สึกพึงพอใจอะไรกับโครงการ
.....
.....
.....
3. ท่านรู้สึกไม่พึงพอใจอะไรกับโครงการ
.....
.....
.....

ลงชื่อ


.....
()

แบบประเมินผลการประชุม

1. ท่านมีความคิดเห็นอย่างไรกับงานสัมมนา ในหัวข้อต่อไปนี้
- เช่น ประชาชนให้ความสนใจมากน้อยแค่ไหน? ข้อมูลที่น่าสนใจมีประโยชน์หรือไม่? หรือสิ่งที่ท่านประทับใจจากการสัมมนาครั้งนี้ โปรดแสดงความคิดเห็นของท่านได้ทั้งด้านต่าง

Question 7

2. ท่านรู้สึกพึงพอใจอะไรกับโครงการ

3. ท่านรู้สึกไม่พึงพอใจอะไรเกี่ยวกับโครงการ

๐๔๕๐

(*Handwritten signature*)
 (*Handwritten name*)

2.2 Pictures from the meeting



Pictures from the site visit during the SFR meeting



2.3 Outcome of consultation process

2.3.1 Minutes of the meeting

The stakeholders registered and received the documents for the meeting: non-technical summary, agenda, SD matrix questionnaire and evaluation form.

South Pole introduced itself and welcome the stakeholders as well as informing about the

objective of the meeting, which are, to inform the project progress and to obtain feedback from the stakeholders regarding the project. After that the representative from South Pole explained about the agenda for today's meeting.

Representatives from Chaodee Starch (2004) and Blue Fire Bio explained about project details, which includes the project location, aim of the project, where does the waste water come from, baseline and project situations, who are involved in the project, how does the UASB system works and finally the project progress so far.

South Pole explained about global warming, greenhouse gases, CDM and how it was related to the project activity for the stakeholders to have more knowledge and understandings about those areas.

Then the representatives from Chaodee Starch and South Pole asked the stakeholders if they understand the project details or do they have any questions about the project details.

Some stakeholders asked questions as follows, (the answers are provided from representatives from Chaodee Starch and Blue Fire Bio together)

Question: how much of the electricity will you produce?

Answer: We have installed 2 electricity generators, which altogether have capacity of approximately 3 MW so they produce electricity around 3 MW.

Question: can you explain more on how the system can contain all the wastewater and have you ever release any wastewater to the other areas?

Answer: no, we have never done that. Currently, the wastewater from the starch factory does not exceed 3,000 cubic meters. With our waste water treatment capacity totally more than 10,000 cubic meters, this can be seen that the whole system can keep all the waste water without the need to release to outside the project activity.

Question: how many open lagoons do you have?

Answer: we have 15 lagoons, which can handle all the wastewater from the starch factory.

The meeting was then preceded to the next session. South Pole introduced the session on discussion about do-no-harm assessment and SD matrix. South Pole explained that the objective of this exercise is to obtain the stakeholder's views on the impacts of the project in their opinions. Then South Pole explained about do-no-harm assessment and each indicator of SD matrix for the stakeholders including giving some examples so that they can have better understandings on the indicators and ask the stakeholders to check their understandings from time to time. The stakeholders were asked to think which indicators are relevant and score them. They are also free to provide their comments verbally.

The stakeholders were interested in seeing the project activity so the project owner took them for the site visit. The stakeholders were able to see the biogas plant, which includes the UASB tanks and the open lagoon. The project owner took the stakeholders to the top of UASB tank where they can see the wastewater flow and overall of the waste water treatment system. The representatives from Blue Fire Bio, together with the project owner, explained to the stakeholders on how the system worked so that the stakeholders have more understanding of the project activity and how the wastewater treatment works.

After the site visit, the stakeholders filled in the questionnaires and provided some comments as well as asked more questions. South Pole summarised the stakeholder's scores and opinions. The project owner responded to the stakeholder's comments and questions. The stakeholder's comments and responses from the project owner are as below,

Question: Will you provide training for local people who are employees of the biogas plants?

Answer: Yes, definitely. We have ISO system and part of the system, we have training program. We have a clear training plan already so you can be confident that the training will be provided to the employees.

Question: Do you have any system to prevent explosion due to biogas?

Answer: Yes, we do. We have flare systems that will burn excessive biogas to prevent explosion. Moreover, the system is well controlled and managed with installed metres to monitor the amount of biogas. The equipments we use have certificate and we also have calibration plan in place in order to make sure the safety for our employees and the surrounding communities.

Question: will the project activity create odour problem to the community?

Answer: if you compare with the time when there was no biogas plant next to the starch factory. The odour from lagoons was very bad. The stakeholders who are native to this area were well aware about this. With the biogas plant, we have a place where the biogas is kept in a closed system so the odour is much less. Therefore, the project activity will actually help lessen the odour.

Overall, the stakeholders were inquisitive and asked several questions as above. From all the comments and the measures that the project owner explained, the stakeholders agreed with those measures and came to the conclusion that there should not be negative impacts from the project.

South Pole therefore, started to discuss about positive impacts from stakeholders, which mentioned in the questionnaire. The stakeholders did not provide any more detailed comments.

South Pole summarized all the comments including measures as above again and asked for the consensus. The stakeholders agreed. Topic on monitoring was brought up but there was no feedback or ideas from the stakeholders on monitoring sustainable development indicators.

The stakeholders were asked to fill in the evaluation forms. South Pole informed further that there would be 2-month period of opening for comments, which will be around December until January. The project documents will be placed at e.g. at Huay Bong Subdistrict Administrative Organization Office, in front of the plant and on South Pole's website. Contact details will be provided so that stakeholders can give any feedback on the project later on.

South Pole and the project owner thanked the stakeholders for their time participating in the meeting and their comments. The meeting was closed.

Note: according to the feedback from the Gold Standard as per pre-feasibility assessment, it was advisable for local NGOs to lead the SD matrix exercise. As no local NGOs attended the meeting; therefore, the project proponent leaded the SD matrix discussion and tried to do in the most appropriate way possible to get unbiased opinions from the stakeholders.

3. Analysis of differences between own sustainable development assessment and the one resulting from the blind exercise with stakeholders. Explain way of consolidation.

As the points from stakeholder's comments from the blind exercise have already taken care of by the system design and measures that the project owner plans to do, which can be seen from the answers by the project owner to the stakeholders. Therefore, the SD matrix in this GS passport will not be different from the own sustainable development assessment.

In addition, from the feedback in the questionnaires (by considering the majority of the stakeholders), the result is that there is no negative on sustainable development indicators.

In addition to the above details of SFR meeting on 12th November 2010, the project documents will be available for stakeholders to comments for at least 2 months or 60 days (around December to January) at Huay Bong Subdistrict Administrative Organization Office, at the plant, and on South Pole's website

SECTION F. Outcome Sustainability assessment

F.1. 'Do no harm' Assessment

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
1. The project respects internationally proclaimed human rights including dignity, cultural property and uniqueness of indigenous people. The project is not complicit in Human Rights abuses.	The project activity is located within the plant area and is surrounded by agricultural areas⁶. The country has already ratified the Human Right Treaties⁷ and there is a national legislation in place prohibiting the violation of this principle, such as the Labour Protection⁸. Therefore, there is extremely small risk of the project causing any harm to human right and cultural property.	Low	n/a
2. The Project does not involve and is not complicit in involuntary resettlement.	This is not relevant for this project, as no resettlement is/was needed. This is because the project activity takes	Low	n/a

⁶ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1 (impacts on natural resources) and 6.1.2 (impacts on bio-resources)

⁷ Referring to the list of Human Rights Treaties for Thailand, http://www.mineaction.org/hr_treaties.asp?c=26&t=

⁸ Referring to the Labour Protection, Chapter 3 Employment of Women
http://portal.labour.go.th/labour/th/webimage/images/law/doc/labour_protection_en_1998.pdf

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
	place within baseline project boundaries⁹. Although, Thailand has not ratified the ILO convention 169, the country has a national legislation, such as Land Code Promulgating Act¹⁰.		
3. The Project does not involve and is not complicit in the alteration, damage, or removal of any critical cultural heritage.	No cultural heritage is enclosed in the project boundary and therefore is not endangered by the project.¹¹ The country also enforces laws relating to this principle such as conservation and environmentally protected areas¹² and protection of community rights¹³.	Low	n/a
4. The Project respects the employees' freedom	If the employees wish, they have the freedom of association and their rights	Low	n/a

⁹ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1 (impacts on natural resources) and 6.1.2 (impacts on bio-resources) on the project location details

¹⁰ Referring to the Land Code Promulgating Act B.E. 2497 (1954), http://thailaws.com/law/t_laws/tlaw0334.pdf

¹¹ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1 (impacts on natural resources) and 6.1.2 (impacts on bio-resources) on the project location details

¹² Referring to the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), Chapter 3, Part 3 Conservation and Environmentally Protected Areas, http://infofile.pcd.go.th/law/1_En_NEQA1992.pdf?CFID=3851201&CFTOKEN=58768925

¹³ Referring to the Constitution of the Kingdom of Thailand, Section 66, <http://www.senate.go.th/pdf/constitution2007.pdf>

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
of association and their right to collective bargaining and is not complicit in restrictions of these freedoms and rights.	to collective bargaining are not restricted. Regarding the international labour standard, Thailand has not ratified the ILO convention 87 (freedom of association) and convention 98 (right to collective bargaining), however, they has been identified as the fundamental conventions¹⁴ by the ILO's Governing Body. Moreover, Thailand has provisioned freedom of association and collective bargaining power as per chapter 6 – 8 of the Labour Relation Act¹⁵ Therefore the likelihood to breach this safeguarding principle is very low.		
5. The Project does not involve and is not complicit in any form of forced or compulsory labour.	With all staff being employed according to the Labour Protection Act¹⁶. Thailand has ratified¹⁷ the ILO convention 29 and convention 105 for elimination of forces and compulsory	Low	n/a

¹⁴ Referring to International Labour Organization, <http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm>

¹⁵ Referring to Labour Relation Act B.E. 2518 (1975), Chapter 6 - 8, http://www.labour.go.th/law/doc/labour_relation_en_1975.pdf

¹⁶ Referring to Labour Protection Act B.E. 2541 (1988), http://portal.labour.go.th/labour/th/webimage/images/law/doc/labour_protection_en_1998.pdf

¹⁷ Referring to International Labour Organization, <http://www.ilo.org/ilolex/cgi-lex/ratifce.pl?Thailand>

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
	labour. Therefore, there is very little chance of the project breaching this safeguarding principle.		
6. The Project does not employ and is not complicit in any form of child labour.	The project does not involve any child labour and is in compliance with all the necessary national regulations. Thailand has ratified the ILO convention¹⁸ 138 (minimum age) and convention 182 (worst form of child labour). The country also enforces the Labour Protection Act¹⁹ according to chapter 4, such as employing children less than 15 years is prohibited and employing children less than 18 years needs to be under strictly regulated conditions.	Low	n/a
7. The project does not involve and is not complicit in any form of discrimination based on gender, race, religion, sexual orientation or any other basis.	The project does not discriminate against individuals and employment of staff is not based on gender, race, religion, sexual orientation or on any other basis. Referring to the international labour	Low	n/a

¹⁸ Referring to International Labour Organization, <http://www.ilo.org/ilolex/cgi-lex/ratific.pl?Thailand>

¹⁹ Referring to the Labour Protection Act B.E. 2541 (1998), Chapter 4 Employment of Young Workers, http://portal.labour.go.th/labour/th/webimage/images/law/doc/labour_protection_en_1998.pdf

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
	standards, there are two conventions relating to this principle, which are 100 and 111. Thailand has ratified ²⁰ the ILO convention 100 (equal remuneration), while the convention 111 is one of the fundamental conventions. Moreover, there is the national legislation in the country that protects the principle, such as the Labour Protection ²¹ and the Constitution of Thailand ²² .		
8. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.	An unsafe handling of the captured gas could threaten the workers 'safety. Although Thailand has not ratified the ILO conventions relating to safe and healthy environment, such as convention 187 ²³ and 197 ²⁴ , the	Medium	Organise training and only authorise trained personnel on-site. Safety procedures will be part of the operation manual. Flare system also contributes to safe working environment as

²⁰ Referring to International Labour Organization, <http://www.ilo.org/ilolex/cgi-lex/ratific.pl?Thailand>

²¹ Referring to the Labour Protection Act B.E. 2541 (1998), Chapter 1, Section 15, http://portal.labour.go.th/labour/th/webimage/images/law/doc/labour_protection_en_1998.pdf

²² Referring to the Constitution of the Kingdom of Thailand B.E. 2550 (2007), Chapter 3, Part 2 Equality, <http://www.senate.go.th/pdf/constitution2007.pdf>

²³ Convention 187: Promotional Framework for Occupational Safety and Health Convention, 2006

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
	country has its own legislation enforcing this principle ²⁵ .		flare will be used to burn excess biogas (which can lead to an accident due to explosion). The project provides employees with required safety equipment to ensure employee safety. There is a social security system in place for the employees and an annual health check-up is conducted to ensure good health of employees. Moreover, regarding employment quality, there is an incentive program to keep the employees motivated and committed to the

²⁴ Convention 197: Occupational Safety and Health Recommendation, 2006

²⁵ Ministerial Regulation On The Prescribing Of Standard For Administration And Management Of Occupational Safety, Health And Environment B.E. 2549 (A.D.2006), http://www.oshthai.org/upload/file_linkitem/20100126033718_2.pdf

Ministerial Regulation On The Prescribing Of Criteria And Method Of Conducting Health Check Up Of Employees And Forwarding The Results Of Health Check Up To Labour Inspector B.E. 2547(A.D.2004), http://www.oshthai.org/upload/file_linkitem/20100126034114_2.pdf

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
			job. The project facility provides residential space as a perk to employees who are not natives from nearby regions.
9. The Project takes a precautionary approach in regard to environmental challenges and is not complicit in practices contrary to the precautionary principles.	The IEE, as part of the document for host country approval, is also required to include not only mitigation but also preventive measures. The country has endorsed the Rio Declaration on Environment and Development²⁶, which covers precautionary approach. Consequently, the country has also reviewed and improved several articles of legislation related to the environment, such as the	Low	n/a

²⁶ Referring to the guidelines for preparing IEE report by Thai DNA (TGO), http://www.tgo.or.th/download/projapprv/Guideline_for_Preparing_IEE_report.pdf and “Thailand’s role in the United Nations” by Permanent Mission of Thailand to the United Nations Office and other International Organizations in Geneva, <http://www2.mfa.go.th/ungeneva/ThailandAndUN.aspx> and definition of precautionary approach from Rio Declaration on Environment and Development, UNDP, principle 15, <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163> , at Rio de Janeiro, where the precautionary approach was implemented internationally.

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
	Enhancement and Conservation of National Environmental Quality Act²⁷ and the Factory Act²⁸. Therefore, there is extremely small risk that the project activity is contrary to the precautionary principles²⁹.		
10. The Project does not involve and is complicit in significant conversion or degradation of critical natural habitats, including those that are (a) legally protected, (b) officially proposed for protection, (c) identified by authoritative sources	There is no relevance to the project as the project boundary³⁰ doesn't include natural habitats. According to the legislation enforced in the country, the state enforces the	Low	n/a

²⁷ Referring to the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), http://infofile.pcd.go.th/law/1_En_NEQA1992.pdf?CFID=3851201&CFTOKEN=58768925

²⁸ Referring to the Factory Act B.E.2535 (1992), http://oaep.diw.go.th/diw/laws_con.php?idcon=10&idmanu=8

²⁹ Referring to the guidelines for preparing IEE report by Thai DNA (TGO), http://www.tgo.or.th/download/projapprv/Guideline_for_Preparing_IEE_report.pdf and "Thailand's role in the United Nations" by Permanent Mission of Thailand to the United Nations Office and other International Organizations in Geneva, <http://www2.mfa.go.th/ungeneva/ThailandAndUN.aspx>

and definition of precautionary approach from Rio Declaration on Environment and Development, UNDP, principle 15, <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>, at Rio de Janeiro, where the precautionary approach was implemented internationally.

³⁰ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1 (impacts on natural resources) and 6.1.2 (impacts on bio-resources) on the project location details

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
for their high conservation value, or (d) recognised as protected by traditional local communities.	policies relating to conservation and environmentally protected areas ³¹ .		
11. The Project does not involve and is not complicit in corruption	Thailand is a signatory of the Convention ³² against Corruption. The risk of project breaching this safeguarding principle is assessed as low.	Low	n/a
Additional relevant critical issues for my project type	Description of relevance to my project	Assessment of relevance to my project (low/medium/high)	Mitigation measure
N/A			

F.2. Sustainable Development matrix

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
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³¹ Referring to the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), Chapter 3, Part 3 Conservation and Environmentally Protected Areas, http://infofile.pcd.go.th/law/1_En_NEQA1992.pdf?CFID=3851201&CFTOKEN=58768925

³² Signatories to the United Nations Convention Against Corruption <http://www.unodc.org/unodc/en/treaties/CAC/signatories.html>

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Gold Standard indicators of sustainable development.	If relevant copy mitigation measure from "do no harm" – table, or include mitigation measure used to neutralise a score of ‘-’	Check www.undp.or/mdg and www.mdgmonitor.org Describe how your indicator is related to local MDG goals	Defined by project developer	Negative impact: score ‘-’ in case negative impact is not fully mitigated score 0 in case impact is planned to be fully mitigated No change in impact: score 0 Positive impact: score ‘+’
Air quality		Target 7. A: “integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources”.	Parameter: odour, reduction in SO₂ and NO_x emission By replacing the open anaerobic lagoon with an enclosed bio-digester, the project significantly contributes to an improvement of odour emissions, which has a substantial impact on quality of life for the employees at the starch plant and residents living in the area close to the lagoons ³³ . Furthermore, the project activity leads to a reduction of emission (SO _x and NO _x) related to fossil fuel combustion, which is displaced by the use of biogas from the project activity for energy generation. Emissions from the project will be reduced in comparison to the baseline. ³⁴ However, as the impact on air quality within the project boundary is not obvious; to be conservative, the reduction of SO _x and NO _x	+

³³ This point is substantiated by the Initial Environmental Examination (IEE), chapter 6 (environmental impact assessment), section 6.1.1.2 (air quality)

³⁴ This point is substantiated by the Initial Environmental Examination (IEE), chapter 6 (environmental impact assessment), section 6.1.1.2 (air quality)

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
			is not taken into account for this indicator.	
Water quality and quantity		Target 7. A: “integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources”.	Parameter: COD in wastewater Water quality - there is a significant improvement in water quality due to the implementation of a more efficient and reliable effluent treatment system. The wastewater discharged after the effluent treatment process will meet the standards and requirements of national regulation³⁵ Water quality The Release of pollutants in wastewater to ground and surface water is the same compared with the baseline. In the baseline, there was no release of waste water to the ground or surface water sources. Water quantity – as the treated wastewater will be reused within the starch plant (zero discharge), the project activity does not have a significant impact on water quantity. Therefore, the score for this indicator is zero.	0
Soil condition		n/a	Parameter: pollution, organic matter content in soil There is no significant difference relative to the baseline scenario. Even though the sludge from an aerobic, close system can be used as soil conditioner³⁶, the impact on soil condition is considered to be marginal. In addition, the UASB system does not require any geo-resources; therefore, the project activity does not have any other impact on soil condition³⁷	0

³⁵ Refer to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1.4 (water both surface and ground water)

³⁶ Source: NREC, “Anaerobic Digestion Of farm and food Processing residues”, p.23-24 (<http://www.mrec.org/biogas/adgpg.pdf>)

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Other pollutants		n/a	Parameter: noise level and other pollutants There is no significant difference compared with baseline scenario for other pollutants. For example noise level is still lower than the requirements ³⁸ by law.	0
Biodiversity		n/a	Parameter: threatened plants and animals The project activity is located within the plant area. Compared to the baseline, no significant change in biodiversity is expected. Therefore, the operation of project activity does not have an impact on variation of life forms in the existing ecosystem.	0
Quality of employment	Organise training and only authorise trained personnel on site	n/a	Parameter: Training plan and record Referring to Do-no-harm assessment, the risk for unsafe working environment is medium; the safety training courses ³⁹ provided for employees will fully mitigate the risk. The training to develop employee's skills in operating & maintaining biogas system as well as in other skills (e.g. ISO9001, teamwork, communication skills etc.) provided by the project activity will have a significant positive impact on job quality in rural context of the project. The training to develop employee's skills in operating & maintaining biogas system includes, for example, Efficiency of biogas system, UASB Checking quality of biogas system by monitored parameters Operation and control biogas system Safety training includes, for example,	+

³⁷ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1 (assessment on impacts on geology and soil resources)

³⁸ Referring to the summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1.3 (assessment on impacts from noise)

³⁹ Referring to company's Training Plan 2010 for employee skill development training and safety training

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
			Basic Fire Fighting (Workshop) Fire Evacuation Plan Emergency plan for chemical spill Emergency plan for LPG leak Emergency plan for fire Emergency plan for explosion of hot oil boiler Emergency plan for electrical short The trainings are scheduled to be at least on annual basis.	
Livelihood of the poor		Target 1. A: Between 1990 and 2015, halve the proportion of people whose income is less than one dollar a day (1.1. Proportion of population below \$1 (PPP) per day, and 1.2 Poverty gap ratio)	Parameter: poverty alleviation On top of creating additional employment (see above), the project will improve the livelihood of those hired through income and national social security. However and because of its limited impact, as poverty alleviation should be an impact in a wider context e.g. for the communities and not only for employees of the project; therefore, the indicator is scored neutrally.	0

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Access to affordable and clean energy services		Target 7. B: Reduce biodiversity loss, by 2010, achieving a significant reduction in the rate of loss (7.2 CO2 emissions, total, per capita and per \$1 GDP (PPP))	Parameter: change in energy use Since the project activity will initially use the generated electricity internally and has a plan to export to grid in the future, it contributes to a better reliability of the local grid as well as adding renewable energy electricity to the grid.⁴⁰ Since Thailand shares a common grid, the project activity will improve the overall access to energy in the grid and help to overcome the ever increasing demand for power in the country in a sustainable manner. Compared with the baseline (fossil fuel based electricity / or heat generation), the communities will be able to also access electricity/thermal energy produced from renewable energy sources. However, considering the small scale of the project, this would not show significant impact, thus the score is zero.	0
Human and institutional capacity		n/a	Parameter: impacts on female employment, schooling, empowerment in the community No changes are expected regarding human and institutional capacity in the region	0
Quantitative employment and income generation		Target 1. A: Between 1990 and 2015, halve the proportion of people whose	Parameter: number of jobs created 4 full-time job positions⁴¹ and at least 6 temporary positions (employed more than 6 months a year); are created for operation and maintenance of the wastewater treatment plant in comparison to the baseline scenario. Majority of the employed staff is from local area⁴². From additional employment as well as the salaries paid to	+

⁴⁰ The project owner plans to export electricity to grid via a power purchase agreement with the Provincial Electricity Authority (PEA), refer to the Purchase Agreement and refer to the summary of IEE, chapter 6, section 6.2.1.2 (impacts on electricity availability of the community)

⁴¹ Referring to the organisation chart of Blue Fire and summary of summary of IEE chapter 6, section 6.2.2.2 (impacts on economic). The exact number of employment at the monitoring period is subject to the company's turnover.

⁴² Please refer to excel sheet for the employee salary payments and employee sheet representing number of people for each position + information about their native (if they are from local area or not)

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
		income is less than one dollar a day (1.1. Proportion of population below \$1 (PPP) per day, and 1.2 Poverty gap ratio) Target 1. B: Achieve full and productive employment and decent work for all, including women and young people (1.5 Employment-to-population ratio, 1.6 Proportion of employed people living below \$1 (PPP) per day)	them lead to positive impacts as a result of the project activity. The minimum wage regulation in the province of Nakhorn Ratchasima is abided by the project, in addition to the perks and incentives offered for the employees as explained in parameter 8 of section F.1 - "Do no harm assessment".	

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Balance of payments and investment		Target 8.D: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	Parameter: net foreign currency savings As previously mentioned, the project activity leads to a significant energy cost reduction by replacing fossil fuels for thermal energy and electricity generation ⁴³ . From a macro-economic perspective, the project will have an impact on net foreign currency savings related to fossil fuel import since most of the fossil fuel used in the baseline is from foreign origin. Nonetheless, since the impact will be small relative to the wide-economy, a neutral score is chosen.	0
Technology transfer and technological self-reliance		Target 8. F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communication.	Parameter: trainings The project showcases an innovative way to treat wastewater, generate clean and renewable energy for agricultural industry. The project contributes to technology transfer ⁴⁴ and has a replicable potential in the starch sector in Thailand. The project activity will provide training in regards to the technology to the employees; however, since this point is already covered in the quality of employment, thus for being conservative, this indicator is scored 0.	0
Justification choices, data source and provision of references				
Air quality	Reference: Summary of Initial Environmental Examination (IEE), chapter 6 (environmental impact assessment), section 6.1.1.2 (air quality) IEE or Initial Environmental Examination is required in order to obtain an approval from the Thai DNA. The summary is provided by project			

⁴³ Please refer to Section A.2 in the Project Design Document.

⁴⁴ Referring to the summary of IEE chapter 4 (Project Details) explaining that the project implements UASB technology instead of open lagoon (baseline)

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
	proponent for the validation process			
Water quality and quantity	Reference: Summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1.4 (water both surface and ground water)			
Soil condition	Reference: NREC, “Anaerobic Digestion Of farm and food Processing residues”, p.23-24 (http://www.mrec.org/biogas/adgpg.pdf) Summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1 (assessment on impacts on geology and soil resources)			
Other pollutants	Reference: Summary of IEE, chapter 6 (environmental impact assessment), section 6.1.1.3 (assessment on impacts from noise)			
Biodiversity	Reference: Summary of IEE, chapter 6 (environmental impact assessment), section 6.1.2 (impacts on bio-resources)			
Quality of employment	Reference: the company's Training Plan 2010 for employee skill development training and safety training			
Livelihood of the poor	Reference: MDG Plus in Thailand, United Nations Development Programme, www.undp.or.th/focusareas/mdgplus.html			
Access to affordable and clean energy services	Reference: the Purchase Agreement between the project owner and Provincial Electricity Authority (PEA) and the summary of IEE, chapter 6, section 6.2.1.2 (impacts on electricity availability of the community)			
Human and institutional capacity	Reference: the outcome of consultation in the stakeholder consultation report. The stakeholders saw other benefits from the project activity but not relevant to this indicator. IEE does not access impacts on this particular indicator.			
Quantitative employment and income generation	Reference: the organisation chart of Blue Fire and the summary of IEE chapter 6, section 6.2.2.2 (impacts on economic). The exact number of employment at the monitoring period is subject to the company's turnover.			

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Balance of payments and investment	Reference: section A.2 in the Project Design Document.			
Technology transfer and technological self-reliance	Reference: Summary of IEE chapter 4 (Project Details) explaining that the project implements UASB technology instead of open lagoon (baseline)			

SECTION G. Sustainability Monitoring Plan

No	1
Indicator	Air quality (odour)
Mitigation measure	n/a
<i>Repeat for each parameter</i>	<i>n/a</i>
Chosen parameter	biogas consumption
Current situation of parameter	Refer to the baseline situation
Estimation of baseline situation of parameter	The open lagoon system releases biogas directly to the atmosphere. The biogas contains hydrogen sulphide, which cause obnoxious odour. The volume of biogas produced and consumed is directly related to odour.
Future target for parameter	No unpleasant odour from biogas
Way of monitoring	How Monitoring biogas consumption in the gas engine and thermal boiler to demonstrate a reduction in odour emission <u>Details⁴⁵</u> <u>BG_{gas engine, y} (Amount of biogas used for power generation in gas engine)</u> Measurements of volume of biogas sent to the gas engines are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily. <u>BG_{boiler, y} (Amount of biogas fired in boiler)</u> Measurements of volume of biogas sent to gas engines are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily. <u>BG_{ToFlare, y} (Total quantity of biogas flared)</u> Measurements of volume of biogas sent to flare are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily. When Refer to how to monitor above By who Project owner

⁴⁵ For full details, please refer to those parameters in the PDD section B.7.1

No		2
Indicator		Quality of employment
Mitigation measure		Organise training and only authorise trained personnel on site
Chosen parameter		Training records
Current situation of parameter		Current situation of parameter is equal to baseline situation
Estimation of baseline situation of parameter		No training about safety as well as in operating & maintaining biogas system is provided.
Future target for parameter		In order to mitigate the risk on safeguarding principle 8, the workers will also be trained in safety procedures to avoid any risk of accident in the future. Also, training for operating & maintaining biogas system is provided.
Way of monitoring	How	Review of training plan for 2010 and training records shall be archived at the end of each training
	When	Periodical (depending on the frequency of training)
	By who	Monitored by BFB

No		3
Indicator		Quantitative employment and income generation
Mitigation measure		n/a
Chosen parameter		Number of employed staffs and the level of income generation.
Current situation of parameter		Current situation of parameter is equal to baseline situation.
Estimation of baseline situation of parameter		Currently the project does not employ staff, most people in the surrounding area work in the agricultural sector.
Future target for parameter		Additional employment as a result from the project activity
Way of monitoring	How	Number of employees and the level of income generation will be demonstrated through HR records
	When	Monthly
	By who	BFB

No		4
Indicator		Project eligibility criteria
Mitigation measure		n/a
Chosen parameter		Biogas utilisation (%)
Current situation of parameter		Refer to baseline situation
Estimation of baseline situation of parameter		0%
Future target for parameter		At least 65%
Way of monitoring	How	Measure: biogas consumption in the electricity generator biogas consumption instead of fuel oil in thermal boiler

		biogas flared And calculation to determine biogas utilisation (%) <u>Details⁴⁶</u> <u>BG_{gas engine, y} (Amount of biogas used for power generation in gas engine)</u> Measurements of volume of biogas sent to the gas engines are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily. <u>BG_{boiler, y} (Amount of biogas fired in boiler)</u> Measurements of volume of biogas sent to gas engines are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily. <u>BG_{ToFlare, y} (Total quantity of biogas flared)</u> Measurements of volume of biogas sent to flare are done continuously using gas flow meters. In recording these parameters, plant's operators shall first manually archive the monitored data onto log sheets then transfer to the computer for electronic storage. Continuously measurements will be done and cumulative reading will be recorded daily.
	When	Refer to how to monitor above
	By who	Project owner

No	5	
Indicator	Soil condition	
Mitigation measure	n/a	
Chosen parameter	Sludge application	
Current situation of parameter	No application of sludge to the soil	
Estimation of baseline situation of parameter	No removal of sludge generated by the open lagoon system.	
Future target for parameter	In case any sludge removal occurs in the future, it will be used as soil fertilizer.	
Way of monitoring	How	Refer to section B.7.1 in the registered PDD Details <u>S_{y, final} (Amount of final sludge as dry matter generated by the wastewater treatment in the year y)</u> The sludge will be weighed and used as soil fertilizer. The end use of sludge generated is monitored in log records in form of soil application site and quantity of sludge

⁴⁶ For full details, please refer to those parameters in the PDD section B.7.1

		generated.
	When	Refer to how to monitor above
	By who	Project owner

Additional remarks monitoring

In addition to the above monitoring plan, regular CDM monitoring procedures as specified in the PDD of the project activity account for:

- Determination of project emissions and emission reductions during the crediting period
- Determination of monitoring method (including data registration, monitoring, measurement and calibration) and the equipment applied
- Quality assurance and control procedures for the monitoring process
- Documentation of all relevant monitoring steps

SECTION H. Additionality and conservativeness



This section is only applicable if the section on additionality and/or your choice of baseline does not follow Gold Standard guidance

H.1. Additionality

The project activity, as explained above, reduces GHG emissions by capturing the methane that would have escaped into the environment from anaerobic reduction of COD in lagoons and also by using the captured methane to replace the use of fossil fuel in heat boiler and to generate power replacing grid electricity. The carbon credit incomes were well taken into account before the project initiation and played a key role in the decision making process.

According to the Gold Standard requirements, the “**Tool for the demonstration and assessment of additionality, Version 05.2**” is applied to demonstrate the additionality of the project activity.

As per GS response letter to the Project Developer Forum in May 2010⁴⁷ and also to the validation team, GS would not re-assess the additionality of already registered CDM projects.

Therefore section B.4 and B.5 of the registered PDD shall be referred the details on additionality.

H.2. Conservativeness

The baseline scenario selection and the calculation of greenhouse gas emission reductions have been carried out in the most conservative manner when the methodology provided to possibilities to act.

- Project proponents have used approved methodologies by CDM Executive Board in order to determine the baseline scenario and calculate emission reductions.

⁴⁷ <http://www.cdmgoldstandard.org/wp-content/uploads/2011/10/PDForumFinal.pdf>

- Likely baseline scenarios have been developed and assessed using guidance provided by the methodologies. A set of quantified scenarios has been described and the most conservative baseline scenario has been selected.
- Calculations have been done in a transparent manner providing full documentation and references to data sources to the DOE.

Please refer to the PDD Sections B.3, B.4, B.5 and B.6 for more details on project boundary definition, baseline scenario selection and emission reductions calculation.

ANNEX 1 ODA declarations

Project financing for this project activity will not use Official Development Assistance (ODA) Funds as defined in the Gold Standard Manual for Project Developers. There are no loans or grants being provided by International Finance Institutions, which include ODA.



บริษัท บลูไฟร์ ไบโอดี จำกัด
BLUE FIRE BIO CO.,LTD.

เลขที่ 61 หมู่ 14 ต.หินลาด อ.สามชุก จ.นครราชสีมา 30210

6 May 2011

GS 662 - Blue Fire Bio wastewater treatment and biogas utilization project

To: Gold Standard Foundation

Declaration of Non-Use of Official Development Assistance by Project Proponent

Mr. Praphan Chaodee and Mr. Chanchai Chaodee on behalf of Blue Fire Bio Co.,Ltd.

As Legal Owner ("Project Proponent") of the above-referenced project, acting on behalf of all project participants, I now make the following representations:

Mr. Ingo Puhl and Mr. Patrick Bürgi on behalf of South Pole Carbon Asset Management Ltd.

I hereby declare that I am duly and fully authorised by the legal owner ("Project Proponent") of the above referenced project, acting on behalf of all project participants, to make the following representations on Project Proponent's behalf:

I. Gold Standard Documentation

I am familiar with the provisions of Gold Standard Documentation relevant to Official Development Assistance (ODA). I understand that the above-referenced project is not eligible for Gold Standard registration if the project receives or benefits from Official Development Assistance under the condition that some or all credits coming out of the project are transferred to the ODA donor country. I now expressly declare that no financing provided in connection with the above-referenced project has come from or will come from ODA that has been or will be provided under the condition, whether express or implied, that any or all of the credits [CERs, ERUs or VERs] issued as a result of the project's operation will be transferred directly or indirectly to the country of origin of the ODA.

II. Financier Declarations

I hereby declare that I have submitted [#] declarations of Non-Use of ODA, representing declarations from all project financiers. If additional financiers are added to the project, I will promptly notify the Gold Standard Foundation and ensure that additional declarations are promptly submitted.

III. Financing plan

I agree to complete and submit a sufficiently clear and transparent financing plan for the project so that during validation and Validator can assess compliance with the Non-Use of ODA requirement.

IV. Duty to Notify Upon Discovery.

If I learn or if I am given any reason to believe at any stage of project design or implementation that ODA has been used to support the development or implementation of the project, or that an entity providing ODA to the host country may at some point in the future benefit directly or indirectly from the credits generated from the project as a condition of investment, I will make this known to the Gold Standard immediately.

V. Sanctions.

I am fully aware that under Section 10 of the Gold Standard Terms and Conditions sanctions and damages may be incurred for the provision of false information related to Projects and/or Gold Standard credits.

Project Owner:

Signed: 

Name: Mr. Praphan Chaodee

Title: Managing Director

On behalf of: Blue Fire Bio Co.,Ltd.





บริษัท บลูไฟร์ ไบโอ จำกัด
BLUE FIRE BIO CO.,LTD.

เลขที่ 61 หมู่ 14 ต.หินลาด อ.ลำานขุนทด จ.นครราชสีมา 30210

Project Owner:

Signed: 

Name: Mr. Chanchai Chaoddee

Title: Managing Director

On behalf of: Blue Fire Bio Co.,Ltd.



Authorized Representative:

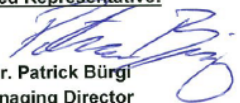
Signed: 

Name: Mr. Ingo Puhl

Title: Managing Director

On behalf of: South Pole Carbon Asset Management Ltd.

Authorized Representative:

Signed: 

Name: Mr. Patrick Bürgi

Title: Managing Director

On behalf of: South Pole Carbon Asset Management Ltd.

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