CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>
Surin Electric Project
Version 1
02/04/2008

A.2. Description of the small-scale project activity:

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The project takes place at Surin Electric Company Ltd and involves the generation of electricity from the combustion of bagasse, a renewable biomass. The project activity is located next to a sugar factory and will install a 10MW turbine generator to generate electricity and supply it to the local grid. The project was commissioned in early 2007.

Sugar factories are typically energy independent, employing co-generation for their own internal steam and power requirements from the combustion of bagasse (a fibrous material resulting from the milling of sugar cane). In the absence of financial incentives to sell surplus power, the set-up chosen is sized to meet the demands of the sugar factory. With the introduction of the CDM the extra revenue stream associated with the registration of the project provides improved returns and thus promotes the expansion of power generation. In the case of the adjacent sugar factory there are three boilers of 170 tonnes per hour and 40 bar/390^{o}C and two 10MW turbine generators installed to provide steam and electricity to the sugar plant[1].

Without incremental power generation the regional electricity companies generate power from their existing thermal and hydro based power plants. Where additional generation capacity is planned this will generally be thermal. The proposed CDM project, increasing power generation at the plant, leading to exports of power to the grid will therefore supplement current and planned electricity generation from traditional fossil fuel based power plants. As the project will utilise bagasse for the generation of electricity it will qualify as a renewable source of electricity.

The factory will make a significant contribution to sustainable development. Its location will foster rural economic growth, much needed in all developing countries to promote rural employment. The construction of the power plant provided employment for about 500 people and the power plant has created 50 new permanent jobs. Furthermore the establishment and operation of the power plant requires skilled labour and much of this will be provided through the on-going training of employees.

A further developmental factor is the generation of renewable electricity which will reduce the dependence on existing and planned fossil fuel based generation. This will have a positive impact not only through the reduction in emissions of greenhouse gases associated with such generation, which is predominantly coal based (see section on determination of the baseline), but also through a reduction in the emissions of other harmful gases (NO_x and SO_x) that arise from the combustion of coal.

A.3. Project participants:

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[1] As mentioned later these units are not able to export to the grid.

Name of Party involved	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as a project participant
Thailand (host)	Surin Electric Co Ltd	No
United Kingdom	Agrinergy Ltd.	No

Surin Electric Company Ltd is the designated official contact for the CDM project activity. Contact details as listed in Annex I.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

>>
Thailand

A.4.1.2. Region/State/Province etc.:

>>
Prasart Surin

A.4.1.3. City/Town/Community etc:

>>
Tumbon Prue

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

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The exact address of the plant is 264 Moo 13, Tumbon Prue, A Prasart Surin.

The latitude of the plant 14 deg, 58 min North and the longitude is 103 deg, 35 min East.

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

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Type I – Energy Industries (renewable/ non- renewable sources)
I C – Thermal Energy for the user with or without electricity

The project produces renewable energy from the combustion of bagasse, a biomass residue. The technology employed is bagasse based cogeneration system which consists mainly of a turbine generator. The project will invest in a grid connection at the plant and the electricity supplied from the project activity to the grid would be expected to replace existing and planned generation from the grid, the majority of which is fossil fuel based.

The project involves the installation of a 10MW backpressure Toyodenki turbo generator. The turbine generator will produce electricity at 3.3kV which will be stepped up at the plant to 22 kV and then

supplied to the grid via the Surin substation 40km from the plant. The turbine has been imported from Japan.

The project will also involve investments in environmental technologies to mitigate the risk of ash and boiler flue gases as well as effluent treatment.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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A ten year crediting period has been chosen.

Year	Annual estimation of emission reductions in tonnes of CO_2e
Year 1	12,197
Year 2	12,197
Year 3	12,197
Year 4	12,197
Year 5	12,197
Year 6	12,197
Year 7	12,197
Year 8	12,197
Year 9	12,197
Year 10	12,197
Total estimated reductions (tonnes CO_2e)	121,970
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	12,197

A.4.4. Public funding of the small-scale project activity:

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The project has not received any public funding.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

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Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

> "A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:
>
> - With the same project participants;
> - In the same project category and technology/measure; and
> - Registered within the previous 2 years; and
> - Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point."

As there is currently no registered CDM project at the site either large scale or small scale, the project will meet the criteria on debundling.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

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AMS I C – Thermal Energy for the user with or without electricity
Version 13

B.2 Justification of the choice of the project category:

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The project activity will establish a grid connection and the electricity supplied from the project activity, through the combustion of bagasse (a renewable biomass material), would be expected to supplement existing and planned electricity generation from the grid, the majority of which is fossil fuel based. Hence the project will generate renewable energy. Some other supplementary biomass fuels may be combusted but these will be limited to biomass residues.

The equipment installed does not generate heat, however the clarification sought of the SSC WG required the project to be proposed as a cogeneration project under category I.C.[2]. In terms of the output of the project activity only electricity is generated. The project activity output capacity of electricity (10MW) is less than the small scale limit of 15MW specified in Simplified Modalities and procedures for small scale CDM project activities[3] and hence qualifies as a small scale activity.

B.3. Description of the project boundary:

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In line with the guidance in "Appendix B of the simplified modalities and procedures for small-scale CDM project activities" the boundary for category I.C. projects is defined as "The physical, geographical site of the renewable energy generation".

For the purposes of the project activity the relevant grid is the power generating units serving the same grid as the project activity. In the case of Thailand we have taken the relevant grid as the national grid which provides a complete analysis of the power plants that the project will affect.

The gases considered within the boundary are limited to carbon dioxide.

B.4. Description of baseline and its development:

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In the absence of the project activity a realistic option for the project owner would have been to continue generating power in the onsite captive power plant. In terms of steam/heat this would continue to be produced from bagasse (renewable biomass) through the operation of a pressure reducing station. Thus the project confirms with baseline conditions in paragraph 7(e) of the methodology.

[2] Clarification SSC_154 given in SSC WG 14, see Annex 6.
[3] Annex II, Simplified Modalities & procedures for small scale CDM project activities.

The project activity through the installation of the turbine generator, solely for the supply of electricity to the grid, is therefore replacing and supplementing grid based generation, i.e. electricity that would be imported from the grid is now being supplied from the project activity. The National Grid has therefore been taken as the determinant of the baseline carbon dioxide emission factor.

The baseline emissions for electricity imported from grid is calculated as per paragraph 9 of the methodology, by multiplying the amount of electricity produced from renewable energy technology with CO_2 emission factor of the grid. The project does not seek to retrofit or modify the existing facility for renewable generation hence negating the use of paragraph 16 of the methodology.

As required by paragraph 9 of the methodology we have adopted the approach specified in the Simplified Baseline and Monitoring Methodologies for Type ID projects to calculate the CO_2 emission coefficient of the national electricity grid by calculating - A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in "Tool to calculate the emission factor for an electricity system"[4]. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered.

The determination of the emission factor follows the guidance and uses the Simple OM (option (a)) and the Build margin applying a weighting of 50% to each to arrive at the final combined margin emissions factor for the project activity. The relevant grid for the determination of the combined margin is selected as the national grid. In the case of imports to the grid from connected electricity system, which occur from Malaysia and Laos, the emission factor for these supplies is set at zero as outlined in the tool[5].

The Simple OM method may only be used where low-cost/must run resources constitute less and 50% of total grid generation in the average of the 5 most recent years. In Thailand low cost/must run generating resources constitute less than 20% of grid generation and this is shown in the following table.

Percentage of low cost/must run generating units, MW

	2001	2002	2003	2004	2005
Hydro	2,886	2,886	2,922	3,422	3,424
Renewable	1	1	1	1	1
SPP renewable	127	152	303	423	496
Imports	340	640	640	640	640
Total	22,035	23,755	25,647	25,969	26,450
% low cost	15.2%	15.5%	15.1%	17.3%	17.2%

Source: EGAT Annual Reports[6]

Aggregate data is used to determine the emission factor for each type of power plant on the grid. The following equations are applied to determine the emissions factors for each fuel type.

[4] EB 35, Annex 12, Tool to calculate the emission factor for an electricity system,Version 1
[5] Page 4, Tool to calculate emission factor for an electricity system
[6] EGAT is the Electricity Generating Authority of Thailand

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y}.COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

Where:

$F_{i,j,y}$	Amount of fuel in year(s) y
$COEF_{i,j}$	CO_2 emission coefficient of fuel i, taking into account the carbon content of the fuels used by relevant power sources j and the percent oxidation of the fuel in year(s) y
$GEN_{j,y}$	Electricity (MWh) delivered to the grid by source j

$$COEF_{i,j} = NCV_i.EF_{CO2,i}.OXID_i$$

Where:

NCV_i	Net calorific value of fuel i
$EF_{CO2,i}$	CO_2 emission factor per unit of energy of the fuel i
$OXID_i$	Oxidation factor of the fuel

The calculations have drawn upon IPCC default country specific values for the NCV and the standard default values for the EF and OXID factors.

Fuel usage and generation by type of plant

	Generation, mkWh			Fuel demand			Units of fuel
	2005	2004	2003	2005	2004	2003	Demand
Natural gas	33065.96	30241.54	31969.63	305156.01	285645	304769	m ft3
Fuel oil	7640.01	5273.13	2112.69	1836.74	1255.4	529	m litres
Lignite	18334.51	17505.82	17133.53	16.57	16	16	m tonnes
Diesel oil	175.73	262.69	48.04	49.81	61.51	17	m litres

Source: EGAT Annual Reports

Emission factors for fuel types

	EF, tCO2/MWh
Natural gas	0.5009
Furnace oil	0.6723
Lignite	1.1268
Diesel	0.8297

In determining the Simple OM we apply the above emission factors to the most recent generation data available for plants on the grid excluding the low cost/must run options. The generation data is aggregated for the SPP (small power producers) which consist of fossil fuel and renewables, we have therefore apportioned generation from this category on the basis of the capacity of units that fall within the renewable/non-renewable generating types. The following table details the calculation of the Simple OM. In some cases the plants may operate on a number of fuels, i.e. natural gas and furnace oil, in these cases we apply the most conservative emission factor (the lowest) to the plant in order to determine the emissions.

Simple OM data

Name	MWh			Emissions tCO2		
	2005	2004	2003	2005	2004	2003
PhranakornTai	3,786,903	3,930,049	4,097,743	1,896,971	1,968,677	2,052,680
Bangphakong 1-2	4,913,569	2,530,059	4,240,487	2,461,352	1,267,381	2,124,185
Bangphakong 3-4	5,751,939	6,293,540	5,179,994	2,881,316	3,152,620	2,594,811
Mae Mou 1-3	0	0	0	0	0	0
Mae Mou 4-7	4,496,275	4,501,249	4,581,205	5,066,563	5,072,168	5,162,265
Mae Mou 8-13	13,863,309	13,027,124	12,581,487	15,621,673	14,679,429	14,177,270
Krabi	1,144,734	1,256,013	145,688	769,661	844,480	97,953
Bangpakong 1-2	624,347	988,509	153,583	312,754	495,173	76,934
Bangpakong 3-4	2,071,558	1,837,157	2,032,197	1,037,705	920,286	1,017,987
Num Phong	1,505,745	1,669,712	2,213,994	754,272	836,408	1,109,055
Phranakorn Tai	6,304,956	5,681,855	5,098,283	3,158,338	2,846,209	2,553,880
Wang Noi	13,436,797	10,475,317	9,752,664	6,730,888	5,247,395	4,885,397
Rachaburi	0	0	95,968	0	0	48,073
Lankrabau	1,267,205	1,083,968	1,081,209	634,780	542,991	541,609
Nhong Chok	6,420	504	0	5,326	418	0
Suratthani	40,361	5,791	3,435	33,488	4,804	2,850
Mae Hong Sorn	2,080	2,321	4,144	1,725	1,926	3,439
Rayong Electric	6,392,881	6,992,211	5,697,193	3,202,383	3,502,605	2,853,892
Khanom Electric	1,030,543	993,234	1,013,345	516,229	497,540	507,614
Khanom Electric	5,242,922	5,167,743	4,935,857	2,626,334	2,588,675	2,472,517
Rachaburi	8,166,389	6,913,898	6,987,553	4,090,785	3,463,375	3,500,272
Rachaburi	14,519,226	13,826,489	11,789,402	7,273,109	6,926,096	5,905,659
Issara	4,286,900	2,831,332	2,081,887	2,147,435	1,418,297	1,042,878
Tri Energy	5,163,179	5,177,685	4,876,644	2,586,388	2,593,655	2,442,855
Glow IPP	4,560,689	5416331	3,209,308	2,284,584	2,713,200	1,607,637
Eastern power	2,626,863	2,246,801	1,472,005	1,315,873	1,125,489	737,371
SPP	10,455,104	10,355,524	10,178,585	6,525,470	6,463,318	6,352,882
Totals	121,660,903	113,204,423	103,407,900	73,935,412	69,172,625	63,871,975
CEF	0.6077	0.6110	0.6177			

Source: EGAT, IPCC

In the case of the calculation of the Simple OM we have used 3 years worth of data and therefore hold the resultant Simple OM constant over the first crediting period.

In considering the BM we are required to calculate the carbon emissions factor based on an examination of recent capacity additions to the grid. These capacity additions should be chosen from the greater generation accounted for:

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

The total generation of the grid under consideration is 134,826 GWh, 20% of which is 26,965 GWh. The five most recent plants only account for 361 GWh and therefore the sample to determine the build margin is selected on the basis of the "power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently". The calculation of the BM requires us to undertake a generation weighted average of the emission of the individual plants, this is shown in the following table. We have chosen to calculate the BM using Option 1 therefore the BM emission factor will be held constant over the crediting period chosen. The following table shows in

chronological order the commissioning of plants and the total generation they supply. Four plants are excluded from the calculation i.e. where generation is set to zero as these projects are proposed CDM projects.

The following equation is applied to determine the build margin emissions factor.

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y}.COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Build margin data

Name	Capacity addition, MW	Date	Generation, MWh	Emissions, tCO_2e
Rachaburi	3,200.00	2002	22,685,616	11,363,895
Malaysia	300.00	2002	1,855,419	0
Lumtakong Dam	500.00	2002	483,798	0
Pisanulok	4	14/03/02	21,968	0
Mitr Kaset Industry	3	29/08/02	16,476	0
Pranburi	3	25/12/02	16,476	0
Glow IPP	713.00	2003	4,560,689	2,284,584
Eastern power	350.00	2003	2,626,863	1,315,873
Korat Industry	8	17/01/03	43,936	0
Gulf Yala Green	20.2	19/05/03	110,938	0
Ratchasima	30	22/05/03	164,759	0
Advance Agro	50	22/09/03	274,598	0
Advance Agroc	25	22/09/03	137,299	0
Kumpawapee	5	27/09/03	27,460	0
New Kwang Sun Hree	2	30/09/03	10,984	0
Tha Maka	2	30/09/03	10,984	0
New Krung Thai	2	30/09/03	10,984	0
Dan Chang Bio Energy	27	19/12/03	148,283	0
Thai Power Supply	1.8	26/12/03	9,886	0
Krabi	340.00	2004	1,144,734	769,661
Mae Hong Sorn	0.50	2004	537.741	0
A.T. Bio Power	20	29/03/04	109,839	0
Phu Khieo Bio Energy	29	13/05/04	159,267	0
Thai Permpoon Industry	4	19/05/04	21,968	0
Singburi Sugar	4	19/05/04	21,968	0
Bua Yai Bio Power	4.4	28/05/04	24,165	0
Ream Udom Sugar	7	16/07/04	38,444	0
Sahareang	8	23/07/04	43,936	0
Mitr Kalasin Sugar	8	06/08/04	43,936	0
Khon Kaen	3	21/09/04	16,476	0
Thaisari Generating	3.5	28/09/04	19,222	0
Bua Sommhay	3	05/10/04	16,476	0
Rayong	6	19/11/04	32,952	0

Khon Kaen Sugar Power	20	21/02/05	109,839	0
District Cooling System and Power Plant	50	21/02/05	274,598	138,988
Mungjarean Power	8	20/05/05	43,936	0
Surachtanee Green Energy	8.8	18/10/05	48,329	0
Isan Sugar Industrial	2.5	18/11/05	13,730	0
Panjapol Pulp Industry	8	21/11/05	43,936	48,242
Satuk Bio-mas	6.5	14/12/05	35,698	0
Ratchasima	8	16/03/06	43,936	0
Refine Chaimongkol	7	16/03/06	38,444	0
Eastern	8	16/03/06	43,936	0
T.N. Sugar Co	8	16/03/06	43,936	0
Asian Supireer Food Co	2.2	04/08/06	12,082	6,115
Total			35,663,732	15,927,359
CEF				0.4466

Source: EGAT, IPCC, EPPO[7]

The weights applied to the operating and build margin are fixed at 0.5, therefore in order to calculate the combined margin we apply these to the Simple OM and BM as calculated above. The following table shows this calculation arriving at the combined margin of 0.5294 tCO_2/MWh.

Calculation of the combined margin

	tCO_2/MWh
Simple OM, $EF_{OM, y}$	0.6121
Build margin $EF_{BM, y}$	0.4466
Combined margin, EF_y	0.5294

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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In line with Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, demonstration of additionality focuses on the investment and prevailing practice barriers highlighted in the guidance[8]. In showing that the project is additional we demonstrate that it is not part of the baseline scenario, which in the case of the project activity is that the power plant would only supply captive electricity to the adjacent sugar factory.

The main barrier to undertaking the project is the investment barrier which is highlighted through an analysis of the returns associated with the project activity. The following table shows the data used for the calculation of the project's internal rate of return.

Electricity generation		
TG capacity	MW	10
TG exports	MW	8
PP auxiliaries	MW	12%
Days		150

[7] EPPO is the Energy Policy and Planning Office, part of the Ministry of Energy

[8] We have also drawn on Annex 34 to EB 35 "Non-binding best practise examples to demonstrate additionality for SSC project activities".

Hours		24
PLF	%	80%
Generation for export	MWh	23040
Tariff	THB/kWh	1.59
Investment and other costs		
Investment	THB m	121,962
Annual maintenance costs as % investment costs	%	5%
Administration		3,034.34
5013401 Utilities	THB m	2,061.47
5013403 Communication	THB m	4.48
6010301 Office	THB m	576.51
6010303 Transport	THB m	24.16
6010406 Administration	THB m	360.00
7020013 Contingency	THB m	7.72
Operating costs		
Demineralisation	THB m	7,776.00
TG cooling water make up	THB m	921.60
Chemicals	THB m	177.58
Ash management	THB m	787.50
Escalation in costs	%	5%
CER price	$/tCO2e	12
THB/$		33

Based on these costs and revenues the project's internal rate of return is 6.9%[9]. The project's internal rate of return has been calculated over a 20 year period.

The most appropriate benchmark for a project internal rate of return is the weighted average cost of capital. However Surin Electric Company Ltd is not a listed company and it is difficult to demonstrate a transparent return required for equity (specifically the value Beta). . A similar project has been undertaken by KSL Group, a listed sugar company, who reported a weighted average cost of capital of 11.7%. The Dan Chang Bio-energy Cogeneration and the Phu Khieo Bio-energy Cogeneration CDM projects[10] used a risk adjusted government bond rate and arrived at a benchmark of 9.69%.

The most readily available transparent benchmark is the rate of commercial lending from the major banks operating in Thailand. This is reported on the Bank of Thailand website[11]. This variable does not represent the higher level of return that is required by equity investors (should financial problems occur at the company debt holders are higher up the payment cascade than equity holders) and therefore is a lower level than the actual benchmark should be set at. Its use therefore is taken because it is a transparent lower boundary and hence conservative. On 20th November 2007 the level was 7.2511%[12].

As highlighted above, this benchmark is below the benchmark used by other similar types of project activities and is conservative.

[9] The spreadsheet provided to the DOE demonstrate the calculation of this internal rate of return.
[10] These were also bagasse based power plants.
[11] http://www.bot.or.th/BOTHOMEPAGE/databank/Financial_Institutions/interestrate/interest_e.asp
[12] The figure quoted is the MLR.

In terms of applying sensitivity analysis to the derived project internal rate of return we have provided adjustments to the days of operation and also the tariff, the two factors that will have the main influence over the project return. The current tariff of Baht 1.59/kWh has been specified in the PPA and this figure has been used in the financial calculations but it should be recognised that this is not fixed and may be varied depending on the gas price. In terms of the days of operation we have also provided sensitivity analysis based on varying these but we feel that it is extremely unlikely that the plant will increase the days of operation and therefore this analysis is skewed downwards. The following table shows that the operating days of a plant in the region over the last five years which average at 122, therefore our assumed value of 150 days presented in the financial analysis is conservative.

Year	Days crushing
2002/03	170
2003/04	131
2004/05	103
2005/06	90
2006/07	114

The following table shows the project's internal rate of return when the days of operation and tariff are adjusted.

		Days		
		125	150	175
Tariff	1.500	No value	3.20%	9.30%
	1.550	-3.70%	5.40%	11.20%
	1.600	-0.40%	7.30%	12.90%
	1.650	1.90%	9.00%	14.50%
	1.700	3.80%	10.50%	16.00%

As evident from the table the main influence on the returns of the project is the days of operation. This is linked back to the cane crushing at the adjacent sugar factory. For the particular project activity, a power plant located adjacent to a new sugar factory, the problem is more apparent as the supply of cane and hence bagasse takes time to develop. Hence if the sugar plant does not crush at capacity the project activity will not operate as expected as the fuel supply (bagasse generated) will only be sufficient to generate electricity for the demands of the sugar factory. Therefore the production of sugarcane is linked back to the project activity and this was evident in the first year of operation 2006/07 when the sugar factory crushed for 90 days but the power plant only operated for 15 days. In order to reduce this risk the project activity has budgeted for supplementary fuel but this is only sufficient for 34 days of operation[13].

Whilst there are a number of grid power projects operating on bagasse in Thailand the majority of these were established under a very different tariff structure. Initially the Small Power Producers programme in Thailand offered fixed power purchase prices to suppliers of electricity. In July 2001 this was changed to a variable tariff based on the gas price. The variability in the gas price therefore provides uncertainty in the power purchase price. Furthermore this provides a greater risk to renewable energy producers as the

[13] The financial analysis presented assumes that the plant operates based on 150 days in each year.

price of the input is not correlated with the gas price[14]. The ability to obtain carbon revenues will bring the revenues of up to previous achievable levels and permit the project to absorb some of the risks associated with fluctuating gas prices.

To provide an idea of prevailing practice in Thailand there are 29 grid based bagasse projects in Thailand supplying electricity to EGAT. Of these 29, 15 were established before the downward revision in the tariff to the current gas based reference system and were therefore undertaken in a different investment climate. Of the remaining 14 plants 12 operate generation systems of less than 5MW. These types of units may be considered as incidental and therefore do not require additional investment in turbines but operate on the basis of excess generation from an existing turbine generator. Of the remaining 2 plants, one is the 34MW unit at Ratchasima (part of the methodology submission for ACM0006) and the other an 8MW unit at Saharuang which has been proposed to a European government CDM purchase programme. It is therefore apparent that the proposed project activity is no common practise within the sector.

As the project starting date is prior to validation evidence has been provided to the DOE that the CDM was considered prior to the start date[15].

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

In line with the methodology we arrive at the emission reductions applicable to the project through the following equations.

Baseline emissions

The electricity supplied by the project activity to the grid would have been generated in the grid using fossil fuels. Therefore, the exports from the project activity cause emission reductions and are given as:

$$BE_y = EG_y \cdot EF$$

Where:

BE_y	Baseline emissions during year y, tCO_2
EG_y	Electricity exported to the grid during the year y, MWh
EF	National grid emission factor, tCO_2/MWh

Project emissions

[14] A gas based power producer would receive lower payments for electricity sold when the price of gas fell but a falling gas price does not imply a falling biomass price and hence there is added risk for the producers of renewable energy in adopting this tariff structure.

[15] The delay in submission for registration has been due to the time taken to receive DNA approval and the subsequent clarification that was requested during the initial validation of the project activity.

As supplementary biomass may be transported from outside we include the emissions that may arise from the transport (PET_y) in the overall calculation. However in line with the guidance in Attachment C if this source is less that 10% of emission reductions then it will be ignored.

$$PET_y = N_y \cdot AVD_y \cdot EF_{km,CO2,y}$$

Where:

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
N_y	Number of truck trips during the year y
AVD_y	Average round trip distance (from and to) between the rice husk fuel supply sites and the site of the project plant during the year y (km),
$EF_{km,CO2,y}$	Average CO_2 emissions factor for the trucks measured during the year y (tCO_2/km)

As no fossil fuels will be fired project emissions from fossil fuels has not been considered.

Leakage

In line with the guidance on leakage the project does not transfer generating equipment from another activity and therefore this potential source of leakage may be ruled out. The category that may be applicable from this guidance is "C – Competing uses for the biomass"[16]. We have therefore undertaken the leakage test to demonstrate that there is sufficient biomass in the area and that the project activity will not result in diversion from other users.

In case leakage occurs, it will be calculated using the following equation:

$$LE_y = EF_{CO2,LE} * \sum_n BF_{LE,n,y} * NCV_n$$

Where:

LE_y	Leakage emissions during the year y (tCO_2/yr)
$EF_{CO2,LE}$	CO_2 emission factor of the most carbon intensive fuel used in the country (tCO_2/GJ)
$BF_{LE,n,y}$	Quantity of biomass residue type n used for heat generation as a result of the project activity during the year y and for which leakage cannot be ruled out using one of the approaches L_1, L_2, L_3 or L_4 (tons of dry matter or liter)
n	Biomass residue type *n* for which leakage cannot be ruled out using one of the approaches L_1, L_2, L_3 or L_4
NCV_n	Net calorific value of the biomass residue type n (GJ/ton of dry matter or GJ/liter)

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	**$F_{i,j,y}$**
Data unit:	Mt, mcbm, kl
Description:	Consumption of fossil fuel by existing grid connected power plants
Source of data used:	EGAT

[16] Attachment C to Appendix B Indicative simplified baseline and monitoring methodologies for small-scale CDM project activity categories provides further guidance on areas where leakage should be considered.

Value applied:	Varies for each plant
Justification of the choice of data or description of measurement methods and procedures actually applied :	For thermal power plants EGAT provides fuel consumption data. The choice of data therefore satisfies the guidance in the methodology, ACM0002.
Any comment:	Data provided from EGAT Annual reports

Data / Parameter:	**$GEN_{i,y}$**
Data unit:	GWh
Description:	Generation of electricity by existing grid connected power plants
Source of data used:	EGAT
Value applied:	Varies for each plant
Justification of the choice of data or description of measurement methods and procedures actually applied :	The EGAT provides data on the generation of electricity by grid based units.
Any comment:	Data provided from EGAT Annual reports and other official EGAT reports which have been provided to DOE.

Data / Parameter:	**NCV_i**
Data unit:	TJ/kt
Description:	Net calorific value of the fuel combusted in grid based power plants used in the determination of the emission factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.
Value applied:	Varies for each fuel type
Justification of the choice of data or description of measurement methods and procedures actually applied :	National net calorific values are not available and therefore we have used country specific IPCC data.
Any comment:	

Data / Parameter:	**$EF_{CO2,i}$**
Data unit:	tCO_2/TJ
Description:	Tonnes of carbon dioxide per energy unit of fuel in grid based plants used in the determination of the emission factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.2
Value applied:	Varies for each fuel type
Justification of the choice of data or description of measurement methods and procedures actually	The values in Table 1-1 have been converted to a carbon dioxide equivalent by multiplying by 44/12.

applied :	
Any comment:	

Data / Parameter:	**$OXID_i$**
Data unit:	%
Description:	Oxidation factor applied to the combustion of fuels in grid based plants for the determination of the emission factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1: Introduction, Section 1.4.2.1
Value applied:	100%
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**$F_{i,m,y}$**
Data unit:	Mt, mcbm, kl
Description:	Consumption of fossil fuel by existing grid connected power plants
Source of data used:	EGAT
Value applied:	Varies for each plant
Justification of the choice of data or description of measurement methods and procedures actually applied :	For thermal power plants EGAT provides fuel consumption data. The choice of data therefore satisfies the guidance in the methodology, ACM0002.
Any comment:	

Data / Parameter:	**$GEN_{m,y}$**
Data unit:	GWh
Description:	Generation of electricity by existing grid connected power plants
Source of data used:	EGAT
Value applied:	Varies for each plant
Justification of the choice of data or description of measurement methods and procedures actually applied :	The EGAT provides data on the generation of electricity by grid based units.
Any comment:	Data provided from EGAT Annual reports and other official EGAT reports which have been provided to DOE.

Data / Parameter:	**$EF_{km,CO2}$**
Data unit:	tCO_2/km

Description:	Emissions factor for transport of biomass
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 3: Mobile combustion, Section 3.2.1.2
Value applied:	0.0011079
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data from the plausible options in Table 1-32 has been chosen most conservatively, i.e. we have chosen data that results in the highest emission factor which will result in the largest transport emissions.
Any comment:	

Data / Parameter:	**SFC_k**
Data unit:	MWh/t
Description:	Specific fuel consumption for bagasse
Source of data used:	Manufacture's specifications
Value applied:	0.265
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is taken from the manufacturers specifications for boiler and turbine: 1 t bagasse = 2.27 t steam 8.55 t steam = 1 MWh
Any comment:	

Data / Parameter:	**SFC_k**
Data unit:	MWh/t
Description:	Specific fuel consumption for bark
Source of data used:	Manufacture's specifications
Value applied:	0.345
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is taken from the following specifications for boiler and turbine: 1 t bark = 2.951 t steam 8.55 t steam = 1 MWh
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline emissions

$$BE_y = EG_y \cdot EF$$

Where:

BE_y Baseline emissions during year y, tCO_2

EG_y Electricity exported to the grid during the year y, MWh

EF National grid emission factor, tCO_2/MWh

The quantity of electricity exported is based on various factors such as installed capacity, operating days, Plant load factor (PLF) and auxiliary consumption. It is initially assumed that the *10MW* plant will operate for *150* days at *80%* PLF with an auxiliary consumption of *12%*.

Exports of power (EG_y) are expected to be 23,040 MWh per year. The grid emission factor (EF) is determined as 0.5294, therefore baseline emissions (BE_y) are estimated at 12,197 tCO_2e per annum.

Project Emissions

$$PET_y = N_y \cdot AVD_y \cdot EF_{km,CO2,y}$$

Where:

PET_y	CO_2 emissions during the year y due to transport of the biomass residues to the project plant (tCO_2/yr)
N_y	Number of truck trips during the year y
AVD_y	Average round trip distance (from and to) between the rice husk fuel supply sites and the site of the project plant during the year y (km),
$EF_{km,CO2,y}$	Average CO_2 emissions factor for the trucks measured during the year y (tCO_2/km)

We assume that biomass residues of 25,000 tonnes of bagasse and 5,000 tonnes of bark will be used by the project. These are sourced from an average distance of 360km and 62km respectively. Given that 1,250 trips are required for the transport of bagasse and 333 trips for bark this yields emissions of 521 tCO_2e, as these are less than 10% of emission reductions we can ignore these.

Leakage

In terms of the leakage test we are required to show that the available biomass will be 25% larger than the quantity of biomass utilised then we can neglect this source of leakage[17]. This test will be performed annually but we have provided ex-ante data on this to demonstrate the limited impact of the project. In terms of biomass availability there is ample biomass within the region that could be utilised by the project activity. The boilers at the site can burn bagasse, cane trash and up to 20% wood bark and 5% rice husk (by weight[18]). The adjacent sugar factory collects cane up to 100km from the plant and we therefore use this as a definition of the region. Our ex-ante analysis of biomass focuses solely on the bagasse and cane trash but will focus on all fuels used in each particular year.

Own biomass		
Capacity	Tcd	24000
Capacity utilisation		71%
Days crushing	Days	150
Cane crushed	Tonnes	2550000
% bagasse on cane	%	27%
Own bagasse	Tonnes	688500

[17] Attachment C to Appendix B, paragraph 18

[18] These have been confirmed by the boiler supplier and evidence of this has been provided to the DOE.

Planned outside biomass		
Outside bagasse	Tonnes	25000
Bark	Tonnes	5000

Potential outside biomass from cane trash and tops		
Trash and tops on cane in field	Sampled	10%
Trash on cane at factory	Measured	5%
Trash	Tonnes	382500

Leakage test		
Total bagasse and cane trash	Tonnes	1101000
Biomass used	Tonnes	718500
% total on usage		153%

The parameters related to leakage emissions will however be monitored ex-post in order to estimate leakage emissions due to externally purchased biomass.

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
Year 1	0	12,197	0	12,197
Year 2	0	12,197	0	12,197
Year 3	0	12,197	0	12,197
Year 4	0	12,197	0	12,197
Year 5	0	12,197	0	12,197
Year 6	0	12,197	0	12,197
Year 7	0	12,197	0	12,197
Year 8	0	12,197	0	12,197
Year 9	0	12,197	0	12,197
Year 10	0	12,197	0	12,197
Total (tonnes of CO_2e)	0	121,970	0	121,970

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**P_y**
Data unit:	MWh
Description:	Units exported to the grid
Source of data to be used:	Plant records
Value of data	23,040MWh

Description of measurement methods and procedures to be applied:	This parameter will be measured daily using meters at the power plant. The data will be kept for 2 years after the end of the crediting period. The meter used to measure exports will be the EGAT installed meter at the site, a EDMI type 2000-6E20-1B013-122-H06 meter with serial number 207650309.
QA/QC procedures to be applied:	The meter reading will be cross-checked with the sales receipts of electricity. In the power plant there is a check meter on panel for generation, a Mitsubishi type M8P-K30VR meter, serial number 070631.
Any comment:	The emission reductions are based on exports to the grid hence the electricity generated need not be monitored. The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	**N_y**
Data unit:	Integer
Description:	Number of trips undertaken to transport biomass to the project site
Source of data to be used:	Transporter receipts and site entry/exit slips for transports
Value of data applied for the purpose of calculating expected emission reductions in section B.5	333 for bark 1,250 for bagasse
Description of measurement methods and procedures to be applied:	Each truck that enters the site will be recorded at the weighbridge from which the number of trucks and will be measured. The recordings at the weighbridge will differentiate the material transported.
QA/QC procedures to be applied:	Procedures to cross check this with financial statements from transporters may be provided.
Any comment:	The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	**AVD_y**
Data unit:	Km
Description:	Average return distance
Source of data to be used:	Transporter receipts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	360 for bagasse 62 for bark
Description of measurement methods and procedures to be applied:	The average return distance will be recorded for each truck on entry to the site.
QA/QC procedures to	This data may be cross checked with payments for transportation of the material.

be applied:	
Any comment:	

Data / Parameter:	**BF_k**
Data unit:	Tonnes
Description:	Biomass used by type
Source of data to be used:	Plant records
Value of data	For outside biomass - 25,000 for bagasse and 5,000 for bark For own bagasse will depend on crush but 688,500 tonnes if the plant crushes at full capacity for 150 days.
Description of measurement methods and procedures to be applied:	The outside biomass will be measured across the weighbridge for each truck entering the site. Own bagasse will be calculated from the analysis of the quantity of cane and laboratory tests on each delivery of cane. A sample of each delivery of cane delivered to the adjacent sugar plant is analysed at the plant.
QA/QC procedures to be applied:	An energy balance may be conducted if required.
Any comment:	The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	**$EF_{CO2,LE}$**
Data unit:	tCO_2/GJ
Description:	CO_2 emission coefficient of most carbon intensive fuel
Source of data to be used:	CEA and IPCC
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The value of the data will be determined annually if leakage has to be applied ex-post.
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Check consistency with IPCC default values
Any comment:	For the calculation of Leakage The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	**NCV_n**
Data unit:	GJ/ton
Description:	Net calorific value of biomass for leakage estimation
Source of data to be	Laboratory records

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Biomass used is tested using the bomb calorimeter present at the laboratory on site.
QA/QC procedures to be applied:	The values will be checked against IPCC standard values and if the latter are more conservative they will be used.
Any comment:	The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity.

Data / Parameter:	$\mathbf{BF_{LE,n,y}}$
Data unit:	tons –dry weight
Description:	Quantity of biomass used at the project activity site for which leakage cannot be ruled out
Source of data to be used:	Plant records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Belt weigher's will be installed at the conveyors present on the site in order to measure this parameter. However, each delivery of biomass will also be recorded at the weighbridge from which the quantity of biomass purchased can also be verified.
QA/QC procedures to be applied:	
Any comment:	The data will be kept for the later of, two years after the end of the crediting period or the last issuance of CERs for the project activity. 100% of the data will be monitored.

Data / Parameter:	-
Data unit:	-
Description:	Demonstration that the biomass residue type n from a specific source would continue not to be collected or utilised e.g. by an assessment whether a market has emerged for that type of biomass residue or by showing that it would still not be feasible to utilise the biomass residues for any purposes.
Source of data to be used:	Information by the site where the biomass is generated.
Value of data applied for the purpose of calculating expected	This will be monitored ex-post

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Monitored annually
QA/QC procedures to be applied:	-
Any comment:	Used for approach L_1 of leakage test.

Data / Parameter:	-
Data unit:	Tons
Description:	Quantity of biomass residues of type n that are utilised in the defined geographical region
Source of data to be used:	Surveys or statistics
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This will be determined ex-post
Description of measurement methods and procedures to be applied:	Monitored annually
QA/QC procedures to be applied:	-
Any comment:	Used for approach L_2 of leakage test.

Data / Parameter:	-
Data unit:	Tons
Description:	Quantity of available biomass residues of type n that are in the region
Source of data to be used:	Surveys or statistics
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This will be determined ex-post
Description of measurement methods and procedures to be applied:	Monitored annually
QA/QC procedures to be applied:	-
Any comment:	Used for approach L_2 of leakage test.

Data / Parameter:	-

Data unit:	-
Description:	Availability of a surplus of biomass residue type n at the ultimate supplier to the project and a representative sample of other suppliers in the defined geographical region
Source of data to be used:	Surveys
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This will be determined ex-post
Description of measurement methods and procedures to be applied:	Monitored annually
QA/QC procedures to be applied:	-
Any comment:	Used for approach L_3 of leakage test.

B.7.2 Description of the monitoring plan:

>>

The main variable in determining the volume of emission reductions is the sale of power to the grid. The gross electricity generated by the new 10 MW turbine and the auxiliary consumption of the power plant will also be monitored in order to cross check the electricity export to the grid. The generation data from the turbine will be continuously recorded by current transformers and a manual hourly record will be made by the turbine operator. This data will be collated at the end of each day and reported in the daily operating report to the factory management. This data will form the basis of the ongoing calculation which will then be tallied against the monthly recordings taken by EGAT and a representative of the project activity.

The recording of biomass will be carried out through the internal testing and reporting of cane and its constituents for own biomass (bagasse). Any outside biomass will enter the site and a record of each delivery will be maintained, this will detail the weight and type of material delivered to the site. This may be checked with transporter and purchase receipts.

All data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of crediting period, whichever is later and the storage of this data will be the responsibility of the project developers.

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Ben Atkinson, Agrinergy Ltd, contact information as listed in annex I.
03/10/07

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
The starting date of the activity started is June 2006; this is the date when the purchase contract for the turbine was signed.

C.1.2. Expected operational lifetime of the project activity:

>>
20y-00m

C.2 Choice of the crediting period and related information:

A fixed ten year crediting period has been chosen.

C.2.1. Renewable crediting period

Not applicable

C.2.1.1. Starting date of the first crediting period:

>>
Not applicable

C.2.1.2. Length of the first crediting period:

>>
Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
15/05/2008 or the date of registration, whichever is later.

C.2.2.2. Length:

>>
10y-00m

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

In relation to the baseline scenario no negative environmental impacts will arise as a result of the project activity.

The positive environmental impacts arising from the project activity are:

- A reduction in carbon dioxide emissions from the replacement of fossil fuels which would be generated under the baseline scenario
- A reduction in the emissions of other harmful gases (NO_x and SO_x) that arise from the combustion of coal in power generation

The new sugar factory has undertaken an EIA and a detailed environmental monitoring plan will be put in place. The project activity will therefore include the following elements in the overall monitoring of the project activity.

Stack emissions: these will be monitored twice a year and the following parameters measured – particulate matter, NOx and SOx. The limits for these parameters are 120 mg/Nm^3, 200 ppm and 200 ppm respectively.
Emissions in soot blow operation: this will be monitored twice a year and the limit is 120 mg/Nm^3.
Ambient air: the ambient air quality will be measured at three locations twice a year. The monitoring will consist of measuring TSP, PM-10 and NO_2, these parameters should be below 0.33 mg/m^3, 0.12 mg/m^3 and 0.17 ppm respectively.
Water quality: the waste water from the plant must be monitored once a month and measurements of the following parameters taken – pH, temperature, BOD, COD, TKN, total dissolved solids and grease/oil.
Noise: monitoring of noise will take place at three locations twice a year.

The monitoring of all these parameters will be undertaken by an independent third party who is certified by the Department of Industrial Work.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>
Environmental impacts are not considered significant.

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>
The local stakeholder review has been undertaken and focussed on people living nearby to the plant. This was conducted as part of the EIA through an attitude survey and independently by the plant through meetings, leaflets, posters and public broadcasting.

The attitude survey was undertaken in February 2005 amongst three broad groups, namely – government agencies and organisations in the area, the leader of the local communities (heads of village, heads of "tambons" and "obotors[19]") and the head of the household in the area. The attitude survey covered five "tambons" (local areas) – Kangan, Banpluang, Prue, Chokenasam and Kokesak-ard. In terms of

[19] An "obotor" is a local leader at the "tambon" level, where a number of "tambons" make an "amphur" (a district).

households 353 households were covered across all "tambons" from a total household population of 3,037.

In June 2006 the project sent two employees to the "obotor" meeting to provide information on the project and the facilities that the company would contribute to the local community.

An NOC from two "obotors" of the "tambon" and the head of the local village (Village number 7 in the Prue tambon) has been received by the project.

E.2. Summary of the comments received:

>>

The survey results from the EIA across the three groups were as follows.

Amongst the government agencies and organisations they responded that the biggest problem in the area was poverty, 41.38%, followed by communications, 24.14% and forest encroachment and air pollution each with 10.34%. When asked if this group was specifically affected by industry in the area 64.29% responded that industry had no affect on them whilst 35.71% said they had been affected, mainly from rice mills, recycling of own tyres and swine farms and 60% of these respondents reported that the affect was medium. In terms of the project 62.5% believed that the project would have a positive environmental impact, 50% mentioned that it should help create employment and 26.92% responded that it should improve the local economy. The concerns from this group was due to wastewater that will be discharged from the project 36.11% and air pollution that may arise from the project, 30.56%

Amongst the head of the local communities 4.76% said that there were problems from dust and noise pollution, mainly caused by traffic. In terms of the opinion on the project most of the group knew about the project had they had received information from the project team. Of the group surveyed 65.52% believed that the project will improve the environment and 35.14% mentioned that the project would help the local economy. Of this group 48% reported they had no concern whilst 20% worried about dust and air pollution and 16% worried about air pollution. Of this group 36.17% wanted the plant to promote local employment and 34.04% wanted a good pollution control system from the factory. Overall 76.19% trust in the environmental handling of the project and 80.95% confident in the government measures imposed on the project.

Amongst the head of the households 53.26% said there was no problem but 46.74% said there was no problem with dust and the main source of this dust was the traffic on the road. In terms of noise 80.74% believed there was no problem with noise whilst 19.26% said there was a problem mainly from the traffic on the road. In terms of wastewater 99.43% said there was no problem and in terms of air pollution 96.03% said there was no problem. In terms of attitude to the project 96.32% knew of the project and 70.03% of those who knew of the project believed it would help reduce environmental problems and 58.91% believed it would help create local employment. In terms of concerns amongst this group 27.68% are concerned about dust and 18.83% are concerned about wastewater.

E.3. Report on how due account was taken of any comments received:

>>

Given that some of the comments related to the environmental systems at the plant leaflets were distributed amongst local people prior to the commissioning of the project which detailed the environmental systems and management used by the project to minimise its impacts. A copy of this leaflet (in Thai) is attached in Annex 6.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project has not received any public funding.

Annex 3

BASELINE INFORMATION

See section B4 for the development of the baseline and the information underlying the calculation of the carbon emission factor. However the following are the sources of data used.

EGAT Annual Reports

http://pr.egat.co.th/AnnualReport/AnnualReport2005/forWeb/index.htm
http://pr.egat.co.th/AnnualReport/AnnualReport2004/index.html
http://pr.egat.co.th/AnnualReport/AnnualReport2003/index.html

IPP and SPP information

http://www.eppo.go.th/power/data/data-website-eng.xls

EGAT data on power plants

Provided in separate file to DOE for upload.

Annex 4

MONITORING INFORMATION

The CDM project data will be collected monthly and held on a spreadsheet tool which has been designed for the project activity. This will permit the monitoring and reporting of emission reductions on a monthly basis.

A detailed monitoring and verification plan has been produced by the plant and this will form the basis of the roles and responsibilities and collection frequency of the data required to monitor the project activity. The electricity exports will be recorded hourly from the power plant meter and daily from the EGAT meter. These daily recordings of the EGAT meter are faxed to EGAT and maybe checked remotely by EGAT. At the end of each day these readings are transferred to an electronic database where the daily records will be held.

Invoices for the sale of power will be generated every month by the accounts department and issued to EGAT. These will form the basis of the monitoring and will be cross checked against payments made by EGAT and PEA.

Quality assurance for the data is high due to the commercial importance associated with electricity exports. The revenue associated with the sale of electricity will be recorded in financial statements and is therefore readily verifiable.

The monthly EGAT records will form the basis of the invoices raised by the factory for the sale of electricity to the grid. These invoices will be generated by the accounts department of the factory and form a further QA/QC check.

The main energy meter under the ownership of EGAT will be calibrated every two years. The energy meters of the power plant, which may be used as check meters, will be calibrated by EGAT every two years and a contract with EGAT for this calibration has been entered into.

All data will be kept for a minimum of 2 years following issuance of certified emission reductions or the end of the crediting period, whichever is later, and the storage of this data will be the responsibility of the project developers.

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Annex 5

STAKEHOLDER INFORMATION

Leaflet distributed amongst local people

Annex 6

SSC WG CLARIFICATION

	CDM: Form for Submissions on Small Scale Methodologies and Procedures (version 03) ***(To be used for presenting questions/proposals/amendments related to the simplified methodologies for small-scale CDM project activity categories)***
Name:	Robert Taylor Institution: Agrinergy
Affiliation[20]:	☐DNA ☐DOE ☒ PP ☐Stakeholder
Title/Subject (max. 200 characters):	Clarification on AMS ID v12 on the installation of a backpressure turbine generator to a steam source that is in the baseline set-up.
Purpose of the submission:	☒ Query on an approved SSC methodology or small scale procedures[21] (Fill in field 1. below) ☐ Request for Revision of an approved SSC methodology (Fill in fields 2. and 3. below) ☐ Proposal for a new SSC methodology (Fill in fields 4. and 5. below)
Approved SSC methodologies[2] to which your submission relates to, if applicable.	AMS ID version 12
Contact Information (e-mail addresses to which the answers are to be delivered and phone contacts for possible dialogue on the submission).	Robert Taylor robert.taylor@agrinergy.com Tel: +91 98 210 96846
Information for completing the form Describe the questions related to the SSC Methodologies, Modalities and Procedures below. If the questions are related to a project under development or implementation, you may describe the context in which they arose.	
Query on an approved SSC methodology or SSC procedures	
1. If you have questions relating to the application of an approved small-scale methodology (AMS) please specify and provide reference to the exact technology/measure below. If you have questions related to procedures for SSC project activities please clarify below:	

[20] Designated National Authority (DNA); Designated Operational Entity (DOE); Project Participant (PP), and Stakeholder.

[21] The list of all approved small-scale methodologies (AMS) can be found at http://cdm.unfccc.int and go to CDM: small scale CDM methodologies.

>> AMS ID version 12 states that "3. Combined heat and power (co-generation) systems are not eligible under this category". We would therefore like to clarify whether a turbine added to a baseline steam source would be applicable under AMS ID, as the turbine does not generate steam (heat) but will release steam to process operations or condense the steam after it exits the turbine.

The project activity will add a turbine generator to a steam source, the steam would be generated in the baseline scenario and there is no change in the steam output resulting from the project activity (relative to the baseline scenario).

The output of the project activity will therefore be only electricity which is supplied to the grid but as the steam is passed through the turbine we would like to clarify whether this would be defined as a cogeneration system.

The only definition of cogeneration is in ACM0006

Cogeneration plant. *A cogeneration plant (also combined heat and power plant or CHP plant) is a power plant that simultaneously generates both electric power and heat. It includes the same components as a power plant and, where applicable, separate heat recovery equipment.*

We do not believe that our project activity (the addition of a turbine) generates both electric power and heat but would like to obtain a clarification to confirm this.

Request for revision of an approved SSC methodology
2. If you are proposing an amendment/revision to an approved small-scale methodology (AMS), please provide justifications below:
>>
3. If you are proposing an amendment/revision to an approved small-scale methodology (AMS) please provide the draft methodology with changes highlighted.
The following documents have been attached to this form: ❑ Draft methodology with changes highlighted in Word and PDF formats ❑ PDD in PDF format (optional) ❑ Additional information (please specify if you are providing any information note, published paper or a report in support of the request for revision of the SSC methodology)
Proposal for a new SSC methodology
4. If you are proposing a new small scale methodology, please provide justifications below :
>>

5. For submitting a new small scale methodologya filled in form "CDM: form for proposed new small scale methodologies (F-CDM-SSC-NM)" is required.	
The following documents have been attached to this form: ❑ Completely filled in form "CDM: form for proposed new small scale methodologies (F-CDM-SSC-NM)" in Word and PDF formats [22] ❑ A draft PDD (with sections A to C completed): ○ Relevant annexes to the PDD are provided ❑ Additional information (please specify if you are providing any information note, published paper or a report in support of the new SSC methodology)	
Date you are delivering the contribution:	08/01/2008
Information to be completed by the secretariat	
SSC-Submission number	

[22] The current version of the form (F-CDM-SSC-NM) is available on the UNFCCC CDM website (http://cdm.unfccc.int).

F-CDM-SSCwg ver 01 SSC_154

CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	11 - 13 February 2008, SSC WG 14
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on AMS I.D. version 12 on the installation of a backpressure turbine generator to a steam source that is in the baseline set-up.
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS I. D version 12
Name of the authors of the query:	Robert Taylor Institution: Agrinergy robert.taylor@agrinergy.com

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

In the baseline scenario steam is produced from biomass residues (producing annually S m^3 of steam at pressure P kg/cm^2 and temperature T ^{0}C) and is passed through a pressure reducing station before being fed to the process operations of an adjacent sugar factory. The proposed project activity intends to use the same steam source i.e. S m^3 of steam at pressure P kg/cm^2 and temperature T ^{0}C in a backpressure turbine for generation of electricity and the steam exiting the backpressure turbine is fed to process operations of the adjacent sugar factory. There will be no difference in steam demand under the baseline and project activities. It needs to be clarified if the project activity defined above would be considered a cogeneration project activity.

ACM0006 defines Cogeneration plant (also combined heat and power plant or CHP plant) as a power plant that simultaneously generates both electric power and heat. It includes the same components as a power plant and, where applicable, separate heat recovery equipment.

The project proponent based on the above definition of cogeneration is of the opinion the proposed project activity is not a cogeneration project activity.

AMS I.D version 12 states that "3. Combined heat and power (co-generation) systems are not eligible under this category". Clarification is therefore needed in the context of application of the AMS I.D version 12 to the proposed project activity.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 30 of the meeting report of the SSC WG 14 http://cdm.unfccc.int/Panels/ssc_wg).

F-CDM-SSCwg ver 01 SSC_154

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG noted from the submission that the installation of a backpressure turbine for generation of electricity where the steam exiting the backpressure turbine is fed to process operations of the adjacent sugar factory is part of a cogeneration system. Therefore SSC WG is of the opinion that the proposed project activity is indeed a cogeneration project activity and not eligible under AMS I.D version 12.

The SSC WG at its 14th meeting also recommended changes to AMS I.C version 12 to allow for situations that involve use of renewable biomass in the baseline for steam generation (see annex 2 of the fourteenth meeting report of the SSC WG).

Ulrika Raab

Signature of SSC WG Chair .....

(Ulrika Raab)

Date: 19/02/2008

Signature of SSC WG Vice-Chair .....

(Kamel Djemouai)

Date: 19/02/2008

Information to be completed by the secretariat	
SSC-Submission number	SSC_154
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Date of transmission to the EB	19 February 2008
Date of posting in the UNFCCC CDM web site	19 February 2008