Appendix A[1] to the simplified modalities and procedures for small-scale CDM project activities

CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL SCALE PROJECT ACTIVITIES (SSC-PDD)
Version 01 (21 January, 2003)

Introductory Note

1. This document contains the clean development mechanism project design document for small-scale project activities (SSC-PDD). It elaborates on the outline of information in appendix B "Project Design Document" to the CDM modalities and procedures (annex to decision 17/CP.7 contained in document FCCC/CP/2001/13/Add.2) and reflects the simplified modalities and procedures (herewith referred as simplified M&P) for small-scale CDM project activities (annex II to decision 21/CP.8 contained in document FCCC/CP/2002/7/Add.3).

2. The SSC-PDD can be obtained electronically through the UNFCCC CDM web site (http://unfccc.int/cdm/ssc.htm), by e-mail (cdm-info@unfccc.int) or in print from the UNFCCC secretariat (Fax: +49-228-8151999).

3. Explanations for project participants are in italicized font *(e.g. explanation)*.

4. The Executive Board may revise the SSC-PDD if necessary. Revisions shall not affect small-scale CDM project activities validated prior to the date at which a revised version of the SSC-PDD enters into effect. Versions of the SSC-PDD shall be consecutively numbered and dated. The SSC-PDD will be available on the UNFCCC CDM web site in all six official languages of the United Nations.

5. In accordance with the CDM modalities and procedures, the working language of the Board is English. The completed SSC-PDD shall therefore be submitted to the Executive Board in English.

6. Small-scale activities submitted as a bundle, in accordance with paragraphs 9 (a) and 19 of the simplified M&P for small-scale CDM project activities, may complete a single SSC-PDD provided that information regarding A.3 (*Project participants*) and A.4.1 *(Location of the project activity)* is completed for each project activity and that an overall monitoring plan is provided in section D.

7. A small-scale project activity with different components eligible to be proposed[2] as a small-scale CDM project activity may submit one SSC-PDD, provided that information regarding subsections A.4.2 (*Type and category (ies) and technology of project activity*), and A.4.3 (*brief statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity)* and sections B *(Baseline methodology)*, D *(Monitoring methodology and plan)* and

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[1] This appendix has been developed in accordance with the simplified modalities and procedures for small-scale CDM project activities (contained in annex II to decision 21/CP.8, see document FCCC/CP/2002/7/Add.3) and it constitutes appendix A to that document. For the full text of the annex II to decision 21/CP.8 please see http://unfccc.int/cdm/ssc.htm).

[2] In paragraph 7 of simplified M&P for small-scale CDM project activities, on clarifications by the Executive Board on small-scale CDM project activities, the Board agreed that in a project activity with more than one component that will benefit from simplified CDM modalities and procedures, each component shall meet the threshold criterion of each applicable type, e.g. for a project with both a renewable energy and an energy efficiency component, the renewable energy component shall meet the criterion for "renewable energy" and the energy efficiency component that for "energy efficiency".

E *(Calculation of GHG emission reductions by sources)* is provided separately for each of the components of the project activity.

8. If the project activity does not fit any of the project categories in appendix B of the simplified M&P for small-scale CDM project activities, project proponents may propose additional project categories for consideration by the Executive Board, in accordance to paragraphs 15 and 16 of the simplified M&P for small-scale CDM project activities. The project design document should, however, only be submitted to the Executive Board for consideration after it has amended appendix B as necessary.

9. A glossary of terms may be found on the UNFCCC CDM web site or from the UNFCCC secretariat by e-mail (cdm-info@unfccc.int) or in print (Fax: +49-228-8151999).

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A. General description of project activity

A.1 Title of the project activity:

Ajbapur Sugar Complex Cogeneration Project

A.2 Description of the project activity:

The proposed CDM project activity is an expansion of electricity generation capacity and the installation of facilities to export electricity to the grid at the Ajbapur Sugar Complex in Uttar Pradesh, India. The efficiency of an existing boiler will be upgraded, with its capacity increased from 50 tph to 65 tph; a 7.5 MW condensing and extraction turbine will be installed (TG5); as will a 132kV step-up station and connection to the Uttar Pradesh grid to allow for the export of electricity to the grid. The turbine generator will be powered by the combustion of bagasse, a co-product of the sugar production process, and other biomass, and will therefore be a renewable carbon neutral source of electricity.

All modern sugar factories are energy independent, employing co-generation for their own steam and power requirements. However in the absence of financial incentives to sell surplus power, the technology chosen is low cost and inefficient. Typically this produces just enough energy for the plant's own consumption. However, given the right financial incentives investments may be made to improve the efficiency and capacity of power generation. This is the situation with the Ajbapur Sugar Complex, which currently has four existing turbines with a total capacity of 10.5 MW, sufficient to meet the factories internal power demand. However neither facilities for, nor capacity to, export electricity to the grid currently exist. The factory management have decided to utilise the CDM to justify an expansion of generating capacity and to allow for export of electricity to the grid. As detailed in section B3, the prospect of CDM revenue has allowed the project to overcome the barriers it has faced, particularly those relating to financial attractiveness, biomass supply and price uncertainty and PPA risk.

The factory was established in 1997, and has increased in size to its current peak capacity of 7,000 tonnes of cane per day (TCD). The construction of the sugar factory has had a major impact on the surrounding rural economy and on the welfare of villagers. The revenue from growing sugar cane exceeds that of alternative crops, and by providing an outlet for increased cane production, the installation and growth of the factory has allowed farmers' incomes to increase sharply. This is illustrated by the increase in the cane area supplying the factory – up from 17,000 hectares in 1997/8 to 42,400 hectares in 2003/4.

In addition to the direct revenue impact for farmers, the sugar factory actively contributes to the development of the local economy. There is a long list of initiatives undertaken by the sugar factory, all of which transform the rural economy and the well being of the local population. These initiatives include:

- Construction of 52 km of roads
- Provision of free medical facilities at four nearby villages, including weekly visits from a qualified doctor and distribution of medicines free of charge
- Establishment of scheme, in collaboration with an NGO, to provide primary education, health, hygiene and self dependency in 10 villages
- Installation of 655 bore wells
- Provision of a chain of agricultural shops, providing quality inputs, services and advice under one roof
- Provision of over 100 extension and community development officers
- Establishment of Green Card system, to allow farmers to access low interest loans from banks, and hence to avoid the use of high interest charging money lenders

Moreover, the presence of the factory has provided sufficient income to allow for the conversion of over 50% of local dwellings to brick and concrete from mud.

Access to secure and reliable electricity supplies is fundamental to development, a factor highlighted by stakeholders' comments (see section G). The project activity will contribute to sustainable development through two key avenues. Firstly, by allowing for diversification of the revenue of the sugar factor through the sale of electricity and CERs, the project activity will assist in establishing the viability of the unit. This will contribute to the continuation and furthering of the benefits the factory's presence provides to the local economy. Secondly, by producing clean and renewable power, the project activity will contribute to electricity security and lead to the displacement of fossil fuel based generation.

A.3 Project participants:

The Ajbapur Sugar Complex is a part of the sugar division of DCM Shiram Consolidated Limited (DSCL). DSCL will therefore be the host company.

Agrinergy Ltd. – Project developer

The official contact for the CDM project activity is Agrinergy Ltd.

A.4 Technical description of the project activity:

A.4.1 Location of the project activity:

A.4.1.1 Host country Party (ies): India

A.4.1.2 Region/State/Province etc.: Lakhimpur-Kheri District, Uttar Pradesh State

A.4.1.3 City/Town/Community etc: Ajbapur

A.4.1.4 Detailed description of the physical location, including information allowing the unique identification of this project activity *(max one page)*:

The address of the Ajbapur Sugar Complex is:

Ajbapur Sugar Complex
Vill. Ajbapur, PO. Mullapur
Dist. Lakhimpur Kheri (UP)
Pin – 261 505

The complex is located in central Uttar Pradesh, 140 Kms from Lucknow and 372 Kms from Delhi. The nearest town is Shahjahanpur, which is 35 Kms from the complex. Shahjahanpur is situated at 27º54'N and 79º57' East.

A.4.2 Type and category (ies) and technology of project activity

Type I – Renewable Energy Projects
I D - Renewable electricity generation for a grid

The project produces renewable energy from the combustion of bagasse and recent biomass. The project falls within the small-scale rating as the total generation capacity of the new unit is 7.5MW, i.e. below the 15MW outlined in section ID of Appendix B to the simplified modalities and procedures for small-scale CDM project activities[3]. The plant is grid connected 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.

A.4.3 Brief **statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity:**

The emission reductions from the project will arise directly from exports of electricity to the grid. These exports result directly from the combustion of bagasse, which is a by-product of sugar cane processing and other biomass. The project activity will therefore generate renewable electricity.

We expect the project to result in a reduction in emissions of 34,000 tonnes of CO_2e per annum.

A.4.4 Public funding of the project activity:

No public funds will be invested in the project activity.

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

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.

[3] For cogeneration plants the limits set on the rating of the primary boiler in section ID is $45MW_{thermal}$. This criterion would apply if CERs were claimed for heat used by the sugar factory. This is not the case as we assume in our baseline that sugar factories are power independent. However, we have calculated the maximum $MW_{thermal}$ rating of the boiler capacity used by TG5, which is 29 $MW_{thermal}$.

B. Baseline methodology

B.1 Title and reference of the project category applicable to the project activity:

Type I – Renewable Energy Projects
I D - Renewable electricity generation for a grid

B.2 Project category applicable to the project activity:

The project activity will produce renewable energy from the combustion of bagasse and other biomass. The plant will be connected to the grid and the electricity supplied from the project activity to the grid would be expected to displace existing and planned electricity generation from the grid, the majority of which is fossil fuel based.

With regard to Appendix B of the Simplified Baseline and Monitoring Methodologies, the project does not fall under point 28 and therefore there is a choice of two approaches left, 29 (a) or (b). We have chosen approach (b) as the baseline for this project:

(b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix.

B.3 Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed CDM project activity *(i.e. explanation of how and why this project is additional and therefore not identical with the baseline scenario)*

B. 3.1 National policies and circumstances

Electricity generation in India is primarily managed by privatised companies that were previously state run electricity boards. The Electricity Act, 2003 is now the main driver of reform in the electricity sector. The Electricity Act, 2003 consolidated the laws relating to the generation, transmission, and distribution and trading of electricity and generally sought to put in place measures to promote the development and supply of electricity across India.

The Electricity Act, 2003 consolidated: the Indian Electricity Act, 1910; the Electricity (Supply) Act, 1948; and the Electricity Regulatory Commissions Act, 1998. The Indian Electricity Act, 1910 granted licences for the supply of electricity and provided the general framework for distribution. The Electricity (Supply) Act, 1948 mandated the creation of State Electricity Boards (SEB), each with the responsibility for supplying electricity in the state. Each state through successive Five Year Plans undertook expansion through the utilisation of Plan funds. Over time the performance of SEBs deteriorated due to a number of factors notably the ability to set tariffs and the political implications of such a measure. To break this link the Electricity Regulatory Commissions Act, 1998 was enacted which created the Central Electricity Regulatory Commission. This permits State Governments to create State Electricity Regulatory Commissions. In conjunction with these reforms some states have undertaken reforms of their own, unbundling supply into separate generation, transmission and distribution companies.

In Uttar Pradesh, the Electricity Reform Act was introduced in 1999. This provided the basis for reform of the electricity sector in the state. In January 2000, the UPSEB was unbundled into three corporations: Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL) which owns and operates the existing thermal power stations of UPSEB; Uttar Pradesh Jal Vidyut Nigam Limited (UPJVNL) which in addition to their own small hydro power houses owns and operates the existing and under construction hydro power stations of UPSEB; and Uttar Pradesh Power Corporation Limited (UPPCL), which is responsible

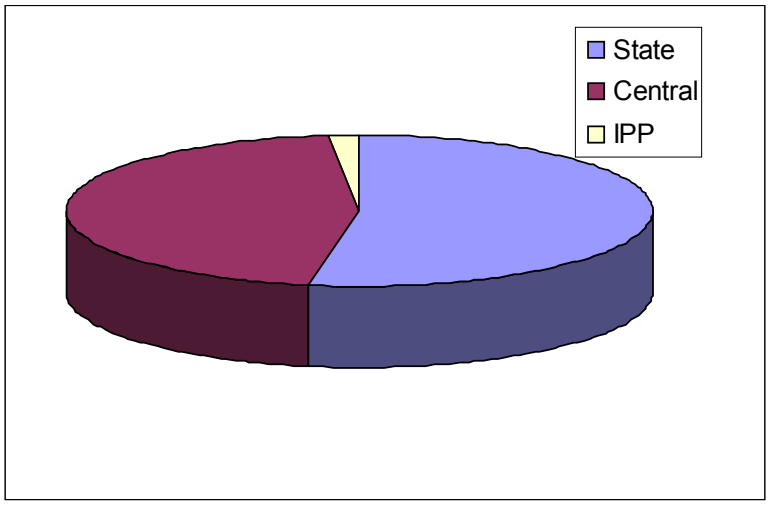
for transmission and distribution of electricity in Uttar Pradesh. The Electricity Act, 2003 goes further than most state legislation, introducing new elements like open access and power trading into the sector.

Whilst the Electricity Act, 2003 does not explicitly set any targets for renewable energy it does mention that the National Electricity Policy should develop the power sector with regard to the optimal utilisation of resources and renewable is mentioned. It also states that the Central Government should, in consultation with State Governments, set out a national policy "permitting stand alone systems (including those based on renewable sources of energy and other non-conventional sources of energy) for rural areas"[4]. There are some incentives for bagasse cogeneration projects from the Ministry of Non-conventional Energy: Interest subsidies exist if boiler pressures are above 60 bar (in the case of the Ajbapur cogeneration project this does not apply) and there is a recommended price for power from renewable sources of Rs 2.25/kWh, paid on a base year of 1994/95 and increased annually at 5%. The latter incentive is a directive from the Ministry of Non-conventional Energy but is unregulated and individual negotiation with the power companies is the norm across India. Indeed, as highlighted below, in the case of the Ajbapur project, UPPCL have raised the prospect that they will approach the regulatory commission to renegotiate the already agreed tariff, and this is a major risk that has provided a barrier to the project activity.

The Indian power grid system is split into five regions, of which Uttar Pradesh falls within the Northern Region. Within the Northern Region, each state has state-owned generation capacity and as outlined above, in UP this is managed by UPRVUNL and UPJVNL. Moreover, as part of the Northern Region, the UP grid also receives power generated by central-government owned plants feeding into the Northern Grid, and power produced by private owned generators which is exported to UPPCL.

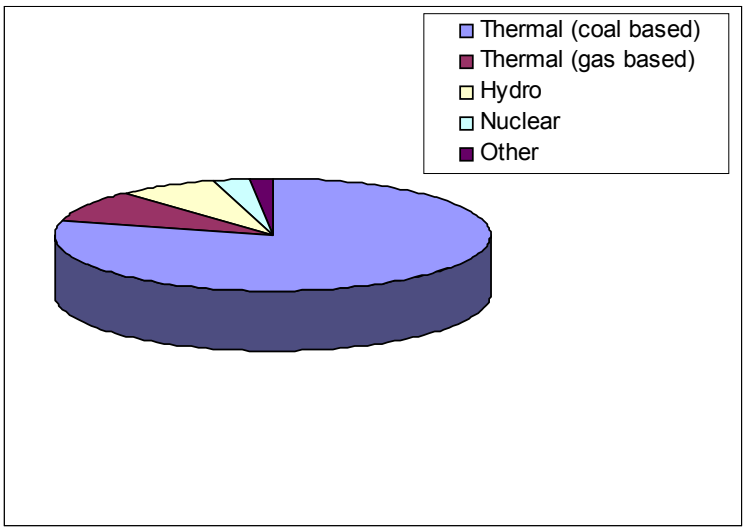
The current generation mix feeding into UP may be divided into three categories: state run generation companies, independent power producers and the central government controlled generation. The following figure shows the mix of these entities by generation capacity and also the make up of the generation capacity.

Figure 1: Generation supplying Uttar Pradesh grid by provider



[4] The Electricity Act, 2003, Part II, paragraph 4

Figure 2: Generation type in Uttar Pradesh by capacity, MW



B. 3.2 Determination of additionality

In line with attachment A to appendix B of the simplified M&P for small-scale CDM project activities, demonstration of additionality focuses on the barriers facing the project. In showing that the project is additional we demonstrate that it is not part of the baseline scenario, which in the case of the Ajbapur cogeneration project is that the factory remains self sufficient in power, but does not export any electricity to the grid.

We undertake additionality analysis through a macro and micro investment scenario analysis of the project and then turn to examine other barriers facing the project. At the macro level we assume that the grid will expand in the future and the most likely scenario representing this expansion is that the least cost generation option prevails. Our analysis therefore initially focuses on the costs of generation under the Ajbapur project activity compared to the costs of generation of alternatives. If we show that the Ajbapur project is relatively high cost we assume it is not part of the likely development of the grid and therefore not the baseline scenario. At the micro level we examine the financials of the project with and without emission reduction revenue, highlighting the importance of emission reduction revenue to the viability of the project. This analysis is supplemented with information on other barriers the project has faced and how the prospect of CER revenue has allowed the overcoming of these.

a) Investment barriers

To determine whether a financially more viable project would have led to higher emissions, we calculate the costs of generation per unit of output from the project, and compare this with equivalent costs of generation from alternative available technologies.

1. Costs of electricity generation from the project activity

In estimating costs of generation from the project activity, a price for bagasse must be input. In Uttar Pradesh, there is an active market for surplus bagasse, due largely to the paper industry, which purchases bagasse as a key input.

Due to lower planting in 2002, cane availability has decreased in the region. For example, the volume of cane crushed by the factory in 2003/4 was over 8% down on the level of the previous year. Demand for bagasse at the local paper mill (Century Paper & Pulp) remains strong, and an increase in sugar cogeneration has been experienced (the major project in the region, implemented by Balrampur Chini Mills, is a proposed CDM project activity). Bagasse prices are reasonably solid and are expected to increase over the foreseeable future. (It should be noted that the impact of lower cane planting will last for a number of years due to the cane growing cycle.) Based on these factors, and reflecting current bagasse prices, we have assumed a price for bagasse of Rs 800/tonne. This is a conservative figure, as it is below the average price received by the factory in Q1 2004 (Rs 822/tonne), well below the level of April 2004 of 1100/tonne, and below the level assumed in the ASC Business Plan, 2004-5 (Rs 1000/tonne).

Table 1 Cost of electricity generation from the project activity

	Rs/kWh
Fuel	1.99
Admin & Personnel	0.21
O&M	0.12
Interest on Late Payment	0.10
Depreciation	0.15
Total	**2.57**

As illustrated in the summary of national policies, the share of IPP generation in the UP grid is low. Moreover, the vast majority of existing generation capacity is coal based and feasible expansion options in UP are essentially restricted to coal based generation. The above project cost of generation is therefore compared with that of a coal plant. We calculate the annualised cost of electricity generation from a 100 MW coal plant using imported coal as Rs 2.24/kWh. Our approach is to follow the assumption that the tariff for new plants will operate on a cost plus basis and therefore the calculation follows the operational norms and procedures for the determination of such a tariff as set out by the Ministry of Power[5]. We have assumed a 100MW power plant with internal consumption set at 10% and a plant load factor of 75%. Gross and net heat rates are taken from the operating norms document and relate to standard operating procedures in India. The method is to adjust the tariff received so that we achieve a return on equity of 16% allowing for the pass through costs as set out in the operating norms. Once we achieve the permitted return on equity we are able to make the simple calculation of the costs of generation, arriving at Rs 2.24/kWh.

The cost of generation from the Ajbapur Sugar Complex project activity is greater than that of the alternative generation options available for expansion of the grid (Rs 2.57/kWh v. Rs 2.24/kWh). Based on the above outline of the national energy policies and circumstances we believe the most likely scenario would be the least cost alternative and therefore conclude that the project activity is not likely to be the baseline.

[5] www.cercind.org/opernorms.pdf

2. Financial analysis of project activity

The Ajbapur Sugar Complex is a part of DCM Shriram Consolidated Limited (DSCL), a successful diversified Indian company engaged in the manufacture of PVC Resin, Caustic Soda, Chlorine, Sugar, Cement and Urea and other agri-inputs. DSCL also is developing an Energy Service Company (ESCO). The turnover of DSCL in 2003-04 amounted to Rs16 billion (USD 348 Million). Being undertaken within a large commercial organisation, the project activity has undergone detailed scrutiny, and it is the prospect of CER revenue that brings the financial performance of the investment up to a level that is considered sufficient to proceed. Indeed, even with CER revenue, the project barely meets the normal DSCL payback period hurdle, and the gaining of experience of the CDM was a key incentive allowing the project to proceed (the energy and other businesses of DSCL also hope to further utilise the CDM). The IRR of the project activity increases from 12% to 19% when CER revenues are taken into account. The financial analyses and assumptions underlying this section will be made available to the validator.

b) Other barriers:

Risks in the pricing of both bagasse and other biomass have provided a substantial barrier to the project activity. The factory has the option to sell bagasse on the open market, and bagasse prices have exhibited volatility in the recent past. High opportunity values for bagasse will make the project activity unviable. Allied to the volatility of bagasse prices, availability of bagasse and prices of alternative sources of biomass also present risks and barriers. A shortage of bagasse at the factory could arise from adverse weather, in particularly drought. Should this occur and the factory need to purchase other biomass, there is the risk that the same conditions adversely impacted other biomass availability. Moreover, should the factory need to purchase additional volumes of biomass (such as rice husks), collection and transport infrastructure will have to be established, incurring additional cost. The prospect of CER revenue, which can be priced forward and is euro or dollar based, has helped the project management overcome the risks and barriers faced by bagasse and biomass pricing uncertainty.

A second major barrier that has faced the project activity is the uncertainty surrounding the received price in the PPA. Although UPPCL has agreed an electricity tariff with the Ajbapur Sugar Complex and signed a PPA, during talks between the UPPCL board and representatives of DSCL, UPPCL asserted that they are considering approaching the regulatory commission to renegotiate the tariff. This is a major risk that the project has faced, as a lower tariff would make the project loss making. CER revenue will to an extent, acted, as a buffer should this occur.

The barriers inherent in bagasse cogeneration projects are highlighted by the lack of projects that have emerged successfully. India is the largest cane producer in the world, with over 450 factories, and whilst there is the capacity to export 4000 to 5000MW, only about 450MW is currently grid connected.[6]

B.4 Description of the project boundary for the project activity:

The project boundary is drawn around the export of electrical power from TG5 to the 132kV grid. Using bagasse to generate steam and electricity for process operations is standard procedure in most modern sugar factories. Therefore power used by the factory is outside the boundary[7]. The export of electricity at

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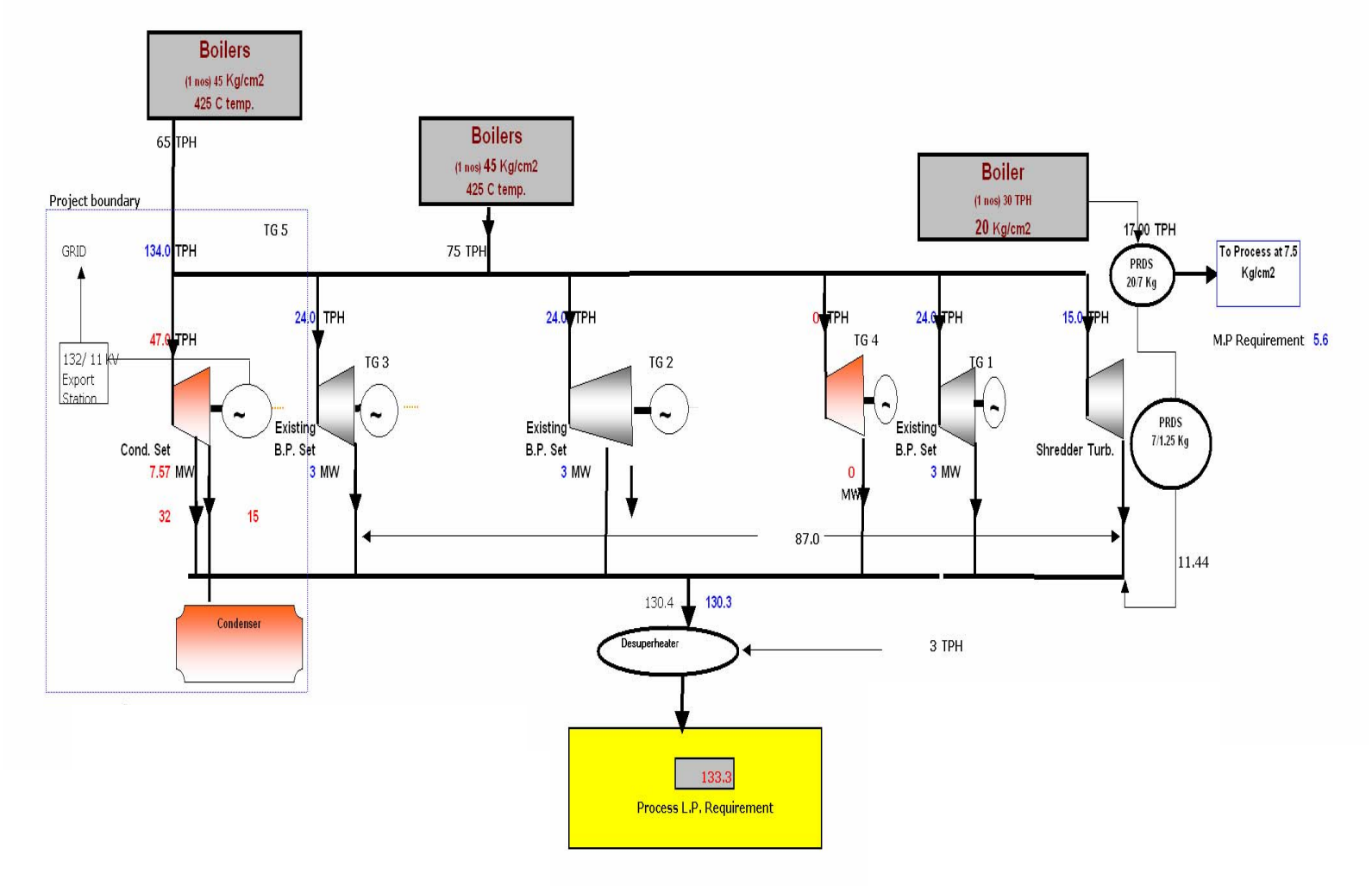
[6] Presentation of S V Shiralkar, MITCON: "Experience Sharing on Grid Connected Bagasse Based Cogeneration in India" from Cogeneration Association of India's Brazil Mission, Sept-Oct 2003.

[7] Should a non-core facility, such as a distillery or stand-alone refinery, be subsequently installed, any power supplied to this from the project activity should qualify for CERs as under the baseline scenario, these units would import power from the grid. It should be noted that there are no plans for the installation of such units.

132kV is solely as a result of the project activity and a distinct boundary can be drawn around this activity, although it is necessary to consider leakage that may occur outside this CDM project boundary as a direct result of implementing the project.

There could be a potential for leakage from power generated at the sugar plant from purchased biomass fuels, which may have been used at other sites to generate electricity. The first purchases the factory will make will be from the nearby Rupapur Sugar Complex (also part of DSCL). This does not have any cogeneration capacity for export, and therefore these purchases will not cause leakage. In the case of any requirement for further purchases, we believe that given the relatively small quantity that is likely to be purchased (below 10,000 tonnes per annum) these should not influence others in their decision to generate power. This is reinforced by the expected source of these purchases – rice husks. There are a number of small rice processing units in the vicinity, which would be in a position to supply rice husk and which do not have their own co-generating capacity.

Figure 3: Project



B.5 Details of the baseline and its development:

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

Referring to Appendix B of the Simplified Baseline and Monitoring Methodologies we have chosen approach 29 (b) - The weighted average emissions (in kg CO2equ/kWh) of the current generation mix. We do not include power to the factory as our baseline assumes that sugar factories are power independent. In the specific case of the Ajbapur Sugar Complex project, the baseline scenario is that the sugar factory remains self sufficient in power, and does not export to the grid. That this is the case and that the project activity is not the baseline has been demonstrated in previous sections through analysis of:

a) Grid expansion - we have shown that grid expansion is unlikely to include relatively high cost generation;
b) Project financials - the project activity is non-viable without the revenue from emission reductions;
c) Other barriers to the project which were highlighted in section B3 and which include uncertainty surrounding biomass availability and pricing and PPA risk.

The project activity consists of investment in a grid connection, step-up unit, boiler improvements and TG5. This will allow and result in export of electricity to the grid, which will be metered and is the volume of electricity that will qualify for emission reductions. The project set up does not allow for the combustion of coal or other fossil fuels, and therefore the monitoring plan simply requires confirmation that no fossil fuels have been combusted.

To obtain the number of CERs generated, qualifying exports of electricity in MWh must be multiplied by the relevant CO_2 emission factor. Thus:

$$CERs = P_e.C \qquad \text{Equation 1}$$

Where:

P_e = Exports of electricity from the Ajbapur Sugar Complex to the grid
C = Constant representing the CO_2 emission factor of displaced power, tCO_2/MWh

Table 2 Determination of baseline variables

Variable	Type	Comment
P_e	Total power exported to the grid	Basis of power that qualifies for emission reductions. MWh.
C	CO_2 emission factor	The CO_2 emission factor that will be applied to qualifying exports to determine the emission reductions arising from the project.

Determination of P_e

P_e is an actual value, and its monitoring is covered in Section D. Due to the installation of a grid connection as part of the project activity, the Ajbapur Sugar Complex will have the ability to import electricity from the grid. Import of electricity will be restricted to maintenance periods, when TG5 is not running, and the volume of electricity required at such times will be low (in the region of 200 kWh/day). The current practice at the mill is to generate power from a diesel generator during the off-season, and

this practice would continue under the baseline scenario. The project activity will therefore result in diesel-based generation being displaced by renewable energy from TG5, and during periods when TG5 is not running, power from the grid. To maintain conservativeness, the emission reductions arising from the displacement of diesel-based generation with renewable generation from TG5 will not qualify for emission reductions. Equally, since imports of electricity from the grid will displace diesel generation, electricity imports will not be deducted from the volume of electricity exports qualifying for emission reductions.

Determination of C

In order to determine C, the appropriate carbon intensity factor, we are required to calculate the weighted average emissions (in $kgCO_2equ/kWh$) of the current generation mix.

In our determination of C we restrict our analysis of the grid to Uttar Pradesh, rather than the Northern region grid, as due to the small-scale nature of the project activity this will be where the main impact occurs.

The generating mix supplying the Uttar Pradesh grid consists of purchases made by UPPCL of Central Sector generation through the Northern region and State owned generation within UP[8]. The following table shows the most recent data on the power stations supplying the Uttar Pradesh grid, and associated emissions of CO_2. The table also shows the calculated weighted average emissions factor, or C.

[8] Data on the detailed make-up of IPP generation in Uttar Pradesh is not available. However, the small volume of such generation would not materially alter the average CEF calculation.

Table 3 Generation and associated CO_2 emissions supplying Uttar Pradesh grid, 02-03

Plant	Type	Net Generation (GWh)	CO_2 emissions ('000 tonnes)
Central			
Singrauli	Coal	5734	4651
Rihand	Coal	2344	2056
Dadri	Coal	557	481
Unchahar I	Coal	1663	1635
Unchahar II	Coal	879	864
Anta	Gas	593	285
Auriva	Gas	1362	654
Dadr G	Gas	1521	730
Salal	Hydro	218	0
Tanakpur	Hydro	95	0
Chamera	Hydro	458	0
URI	Hydro	486	0
NAPS	Nuclear	1020	0
State			
Obra	Coal	6729	7872
Panki	Coal	1129	1351
Harduaganj	Coal	1750	2371
Paricha	Coal	1027	1201
Anpara	Coal	7606	7073
State Hydro Generation	Hydro	1377	0
Total		36547	31223
	Weighted Average CO_2 Emissions Factor		**0.854**

Source: CEA, NREB, UPPCL, Mittal & Sharma.

B.5.2 Date of completing the final draft of this baseline section *(DD/MM/YYYY)*: 28/05/2004

B.5.3 Name of person/entity determining the baseline: Ben Atkinson, Agrinergy Ltd. Agrinergy Ltd. is a project participant, and contact details are provided in Annex 1.

C. Duration of the project activity and crediting period

C.1 Duration of the project activity:

C.1.1 Starting date of the project activity: October 2004

C.1.2 Expected operational lifetime of the project activity: *(in years and months, e.g. two years and four months would be shown as: 2y-4m.)*

20 years

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

C.2.1 Renewable crediting period *(at most seven (7) years per crediting period)*

C.2.1.1 Starting date of the first crediting period *(DD/MM/YYYY)*:

C.2.1.2 Length of the first crediting period

C.2.2 Fixed crediting period:

C.2.2.1 Starting date: 01/10/2004

C.2.2.2 Length: 10 y

D. Monitoring methodology and plan

D.1 Name and reference of approved methodology applied to the project activity:

Type I – Renewable Energy Projects
I D - Renewable electricity generation for a grid
"Monitoring shall consist of metering the electricity generated by the renewable technology."

D.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The project activity will provide electricity to the Uttar Pradesh grid. This electricity will displace existing grid generation capacity and future planned grid capacity additions. The main variable in determining the volume of emission reductions is power exports to the grid.

Exports of power from the project activity will be metered at the nearby Mohammadi substation. Meter readings will be recorded at the end of each month in the presence of both a senior executive engineer of UPPCL and a representative of the Ajbapur Sugar Complex and will form the basis for invoice and payment for power sold.

D.3 Data to be monitored:

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (Electronic/ paper)	For how long is archived data to be kept?	Comment
1 Electricity exports to the UPPCL grid	Quantitative	P_e	MWh	M	Monthly	100%	Paper	12 years	
2 Confirmation that no fossil fuels have been combusted	Qualitative	-	-	Measured	Annually	100%	Electronic	12 years	

D.4 Name of person/entity determining the monitoring methodology:

Mr M. K. Goel, Ajbapur Sugar Complex
Ben Atkinson, Agrinergy Ltd.
Project participants

The DOE used to verify ERs from the project activity is required to ensure that the monitoring plan has been implemented correctly and is required to appraise the data according to accuracy, comparability, completeness and validity. In performing verification, the DOE should conduct regular on-site inspections that may comprise; interviews with managers and operators and observation of processes and controls. The project operator will make available all relevant data as outlined in section D3. in a timely manner as and when requested by the verifier.

All data will be kept until 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later. This will be the responsibility of the project developers.

The following spreadsheet tool has been designed for the project activity. This will permit the monitoring and reporting of emission reductions on a monthly basis. Data input is required in the blue cells with resultant calculations of the CERs performed automatically.

MVP – *to be completed monthly*

Static data	
CIF, tonnes CO2e/MWh	0.854

	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/2014
Time										
Start date										
End date										
Hours	0	0	0	0	0	0	0	0	0	0
Electricity exports										
Sept										
Oct										
Nov										
Dec										
Jan										
Feb										
Mar										
Apr										
May										
June										
Jul										
Aug										
Total exports	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CERs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

E. Calculation of GHG emission reductions by sources

E.1 Formulae used:

In order to calculate the emission reductions arising from the project we have followed the formula specified in Appendix B for Type I D projects - power exports multiplied by an emission coefficient. This is shown by Equation 1, with the derivation of C outlined in section B5.1.

E.1.1 Selected formulae as provided in appendix B:

$CERs = P_e.C$ Equation 1

$CERs = P_e.0.854$ Equation 2

Where:

P_e = Exports of electricity from the Ajbapur Sugar Complex to the grid
C = Constant representing the CO_2 emission factor of displaced power, tCO_2/MWh (0.854 tCO_2/MWh as derived in Section B5.1)

E.2 Table providing values obtained when applying formulae above:

Variable	Value				
C	0.854	0.854	0.854	0.854	0.854
P_e (MWh per annum)	30,000	40,000	45,000	50,000	55,000
CERs (per annum)	25,620	34,160	38,430	42,700	46,970

F. Environmental impacts

F.1 If required by the host Party, documentation on the analysis of the environmental impacts of the project activity: *(if applicable, please provide a short summary and attach documentation)*

The Ajbapur Sugar Complex meets all environmental guidelines and regulations as set out by the regional and national environmental agencies. When the plant was constructed in 1997 a complete Environmental Impact Assessment was carried out and a further EIA is was carried out twice during the capacity enhancement to 5000 TCD and again for 8000 TCD and as such a separate study is not required for the project activity.

Each year the Ajbapur Sugar Complex must obtain consent from the Uttar Pradesh Pollution Control Board (UPPCB) for air and water pollution. The current consent form expires on 31st December 2004 and the factory is in constant compliance with the requirements of UPPCB. At each verification an up to date consent form will be produced. The DSCL management is highly environmental conscious and plant has got in place Quality Management System Standard ISO-9001-2000, Environmental Management System Standard ISO-14001: 1996 and Occupational Health and Safety Management System Standard OHSAS-18001: 1999 certified by DNV and effective since 15.10.2003.

G. Stakeholders comments

G.1 Brief description of the process by which comments by local stakeholders have been invited and compiled:

Approximately 90% of the local population is involved in the growing of sugar cane, and therefore key stakeholders identified were growers and farmers. A stakeholder meeting was organised, and 29 representatives of cane growers associations and of the local community attended.

The minutes and list of attendees of the stakeholder meeting will be made available to the validator.

Notification of the project activity was also provided in a newsletter produced by the Ajbapur Sugar Complex for growers, and in a local newspaper. Both notifications invited comments.

G.2 Summary of the comments received:

Stakeholders' comments at the meeting all demonstrated that electricity availability was a key concern for them, and that therefore the generation of electricity at the sugar factory for export to the grid was viewed positively as a step towards their achieving adequate provision of electricity. There was a wish expressed by some that the factory could become involved in electricity distribution itself, to ensure that the local villagers could benefit directly from the electricity generated.

No comments were received from the written notifications.

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

In terms of the latter point raised in section G.2, the Vice President of the Ajbapur Sugar Complex (who was present at the meeting) explained that it was not possible at the moment for the company to become involved in electricity distribution, and that UPPCL had insisted that the factory supply power to the 132 kV grid.

Annex 1

CONTACT INFORMATION FOR PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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