

**ANNUAL COST SURVEY
AND
IMPACT ASSESSMENT OF ADVANCE SUBSIDY PAYMENT**

**BIOGAS SECTOR PARTNERSHIP-NEPAL
(BSP-N)**

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EXECUTIVE SUMMARY

PURPOSE

- The Biogas Sector Partnership–Nepal (BSP-Nepal), an NGO, is implementing BSP Phase-IV with the financial and technical support from Alternative Energy Promotion Centre (AEPCC) and SNV/N. The subsidy component for BSP-IV has been co-funded by KfW, DGIS (through SNV) and GoN (through AEPCC). The biogas programme covers the Terai, hills and remote hills, and the subsidy is deployed according to this classification.
- A total of 172,505 plants have been installed in 66 districts of Nepal till FY 2063/64 (mid-July 2007). The target of 135,000 units (originally set at 200,000 units but later scaled down) of BSP Phase-IV (July 2003 to June 2009) is also a target envisaged in the Tenth Plan (mid-July 2002 to mid-July 2007) of the Nepalese government.
- Since financial subsidy is utilized as a major intervention to stimulate the market, BSP-Nepal also tries to ensure that there is a fair competition among the companies and, at the same time, to ensure that farmers benefit in terms of fair prices for the plants for which they pay. For this, there has been the practice of approving the price quotation for biogas plants at the beginning of every fiscal year.
- Working capital shortage is a major financial problem faced perennially by most of the biogas companies, and this has led the companies into a vicious cycle of poor profitability, resource crunch, management deficiencies and limitations in capacity, and to further poor profitability. The ultimate results of the working capital problem are poor management, unhealthy competition, unmet quantitative targets of the companies themselves, and the overall qualitative expectations of the BSP.
- The study has of two separate objectives which are as follows:
 - To undertake an annual cost survey to analyze the change in price of raw materials, labour, appliances, etc (including a lamp and pressure gauge) and to recommend a revised quotation for biogas plants for FY 2064/65 (2007/08 AD).
 - To undertake an assessment of impact made by the provision of advance subsidy payment and by the provision of working capital for those companies, which could not get the advance subsidy.
- The study is based on analysis of primary data collected during field visits to limited sample areas covering Pokhara, Butwal, Chitwan, Birtamod, Itahari and Biratnagar, Kathmandu and Banepa and markets in most of those areas. Secondary data were collected from previous researches related to biogas and from records of BSP-Nepal.

RESULTS

The results of the study on annual cost survey and impact assessment of advance subsidy payment are discussed under the following headings: (i) Costs and Prices of Plants, (ii) Working Capital Support, (iii) Impact Analyses of Working Capital Support, (iv) Analyses of Impact on Workshops, and (v) Cash Conversion Cycles and Working Capital Requirements

(i) Costs and Prices of Plants

- The direct cost components of a biogas plant are (a) construction materials and labour, (b) pipe and fittings, (c) appliances provided by company (d) construction and supervision, (e) after sales service fees, and (f) promotion and training. Unlike the quotations of the previous years, the quotation for FY 2064/65 includes the costs of pressure gauge and gas lamp as optional components.
- The average market prices were adjusted for the purpose of the quotation to be prepared. In the average market prices taken separately for the Terai and hill, the adjustments include the addition of 3% transportation for Terai and hills, 5% inflation and 2% wastage to the prices of construction materials and pipe and fittings.
- On the other hand, the prices of workshop appliances are the national average prices. Only additional transportation costs of 3% for Terai and 5% for hills have been considered for this category of materials.
- As per practice, the prices have been worked out for Terai, Hill and Remote Hill regions. The prices of all materials and appliances for remote hill regions have been calculated at 10% increment from the prices for hill region to cover the transportation cost. The construction and supervision costs approved for the 2063/64 were valid for the 2064/65 quotation as well. Thus, the same amounts ranging upwards from Rs. 2200 have been considered for that category of cost.
- The after sales service charge of Rs. 600 has been maintained. The training and promotion cost of Rs. 150 has been considered against the previous year's amount of Rs. 100. These two categories of charges are supplemented by the BSP which the companies are expected to spend under the respective heads.
- The overheads in the form of company service charge or administrative costs are calculated at 50% of the total of material costs borne by the company (pipes and fittings and appliances provided by company) and technical and supervision costs.

(ii) Working Capital Support

- A total of 17,663 plants have been constructed in 2063/64 by 66 companies ranging from the highest of 2,236 plants to a lowest of only 1 plant. The top 10 companies alone have constructed 54% of the total plants, and 75% by the top 20 companies. The average plant per company is 267. With a targeted 26,000 plants for 2007, there is a shortfall of about 8,400 plants in the year alone.
- Such a target cannot be achieved unless the companies increase their production capacity. More than two thirds of the companies have constructed an average of 95 plants. 14 companies have constructed less than 50 plants which is the minimum target set for a company or branch by BSP-Nepal.
- Working capital shortage has been identified as a prominent problem faced by the companies resulting in low plant number and poor financial efficiency. This has in turn led companies to lose on benefits of bulk purchase, credit, discount etc in the purchase of raw materials and components.
- Companies also face shortage of capital due to late reimbursement of subsidy which is attributed to a number of factors like long processing time taken at BSP-Nepal and AEPC for release of subsidy due to delay in report submission by companies or submission of incomplete documents, and also due to delay in entering into annual agreement with companies etc.
- The working capital problem of the companies reverberates all the way to these workshops as well as most of them are entirely dependent on the biogas companies as

their customers. Workshops face huge receivables as biogas companies reportedly take long periods (as long as a year by some) to make the payments.

- In this backdrop, the BSP initiated the advance subsidy payment scheme for biogas companies against a bank guarantee since 2062/63 (2005/06 AD). The advance subsidy payment is given in the beginning of fiscal year at a rate of Rs. 2,000 per plant for plants constructed by individual companies in the previous fiscal year.
- The advance subsidy payment also functions as a pressure on companies to meet the targets sets by them. If the target is not met, the advance subsidy payment received in the beginning has to be returned on the basis of the difference in number of plants. One of the conditions of BSP in providing the advance subsidy payment is that companies increase their plant production by 20%.
- For companies that cannot submit bank guarantees, working capital support has been designed in the form of credit which they get through NBPG at the time of purchase of various appliances and components for the plants. This has been made possible through a working capital revolving fund made available to NBPG by BSP-Nepal.
- The NBPG credit scheme was conceived to make outright payment to workshops by NBPG on the purchase of different appliances by individual companies. For this service rendered to the companies, NBPG would levy a 5% service charge to cover its administrative costs. However, so far, the working capital credit through NBPG has not been utilized as conceived, and the fund has virtually been lying idle.
- According to BSP's working capital support modality, companies are not allowed to receive double support, i.e., both advance subsidy payment from AEPC and credit from working capital revolving fund through NBPG.

(iii) Impact Analyses of Working Capital Support

- From the survey of different biogas companies, 35 companies that gave positive response were grouped into four categories for various analyses of impact of working capital support: (a) companies only receiving advance subsidy payment from AEPC, (b) companies only receiving goods on credit facility from NBPG¹, (c) companies receiving both advance subsidy payment and goods in NBPG credit, and (d) companies receiving neither advance subsidy payment nor NBPG credit facility. Out of the total samples, only 16 companies have received advance subsidy. 13 received NBPG credit but not advance credit, and 6 companies received neither.
- The analysis of different variables shows that companies receiving advance subsidy have higher average number of permanent and temporary staffs, higher capacity to maintain stocks, higher production capacity, and have set higher targets for this year. These show that such companies have bigger institutional capacity than those companies not capable to put forward bank guarantee required being eligible for advance subsidy.
- The average number of plants constructed by advance subsidy receiving companies is three times higher than that of companies not receiving the facility.
- The majority of the companies unanimously agree that the advance subsidy has a positive impact on reducing the amounts of loans taken, facilitating daily operations,

¹ Here, the NBPG credit refers to the credit facility usually offered to biogas companies in the purchase of materials such as main gas valve, emulsion paint, plastic pipe etc. from NBPG's subsidiary company, NREDC. NBPG credit does not mean the credit available as working capital support from the working capital revolving fund made available to NBPG by BSP-Nepal.

and avoiding the need to take short term loans. There is a positive impact on their profitability. There is a similar agreement of the impact of NBPG credit except that the amount is very small to substitute short term loans which they require.

- Most companies rely on external loans and the average loan repayment period of the companies (for 2063/64) varies from 142 days (for category of companies receiving neither advance subsidy nor NBPG credit) to 209 days (for category of companies receiving both facilities) with high standard deviations. Loan amounts have been increasing among all companies, and are stated to increase further in the current year. The companies receiving advance subsidy expect to seek higher loans irrespective of the advance subsidy they have been receiving or will be receiving this fiscal year, indicating that these companies will be expanding their business further and the advance subsidy amount they receive does not fully support their expansion plans.

(iv) Analyses of Impact on Workshops

- The analyses of workshops are based on the survey of 10 biogas workshop companies in Butwal, Bharatpur, Biratnagar and Banepa. The average production capacity of workshops is 3250 (in terms of production of sets of appliances for biogas plants). The production capacity varies from 1,000 sets to 7,000 sets.
- The average credit allowed by workshops is 112 days but the average period of receipt of payments from biogas companies goes to 256 days, more than twice the credit period given by them. Biogas companies take much longer period to make payments to workshops compared to the hardware dealers/companies.
- The majority of workshops do not agree that the facility of advance subsidy payment or NBPG credit to biogas companies has any positive impact on them as the latter have not changed their style of payments to the workshops with and without advance subsidy receipts. The feeling is the same – the biogas companies are apathetic to workshops.

(v) Cash Conversion Cycles (CCC) and Working Capital Requirements

- The average CCC is 18 days indicates that companies need to take loans to cover their operating expenses for that many days. The negative CCC indicates that some companies that have surplus financial resources to cover their operating cost for 103 days. This is an indication of a sound financial strength and that they do not face working capital problem and can in fact lend out money if required.
- Companies receiving only advance subsidy have the lowest mean CCC of 8 days. This category also has companies with surplus fund for 26 days. Understandably, companies receiving neither advance subsidy nor NBPG credit need to rely on loans for 46 days (the longest period).
- The companies receiving only advance subsidy payments have the lowest amount of working capital requirements that needs to be supplemented through loans to construct the number of plants planned for the year. This requirement will be covered with the advance subsidy payments they will be receiving in the current fiscal year.
- The correlation between planned plants for 2064/65 and advance subsidy received in 2063/64 is highly positive (91%) and significant, indicating that higher the advance subsidy received by companies, the higher the number of plants planned for the subsequent year by the companies.

RECOMMENDATIONS

- Overall, the working capital support of BSP has made a good impact on the companies and also to the biogas sector. The advance subsidy payment scheme should be continued with some changes in payment modality.
- Rather than deducting total amount of advance subsidy received in the first reporting, the deduction at the time of subsidy release should be done in a phase-wise manner to facilitate companies to be able handle other payments without much constraint. Since AEPC has possession of bank guarantees, BSP-Nepal should recommend a comfortable phase-wise recovery of advance subsidy payment.
- The little credit provided by NBPG in the sale of main gas valve and other materials has positive implication. The NBPG working capital credit should be initiated immediately with wider scope of support. NBPG should consider making direct payment to workshops as per the bills of purchase by the companies
- Apart from the existing system of grading, it is suggested that biogas companies be additionally graded/categorized and delegated to operate in designated areas/regions only according to their grades to discourage small companies from operating wherever they like, and to control unhealthy competition with larger and established companies. It will also put pressure on companies to achieve the minimum 50 plants or their other targeted numbers.
- Workshops should be informed about impending non-continuation of agreement by BSP-Nepal with biogas companies to quell the anxiety of loss of receivables of workshops from such companies.
- As biogas companies have shown scant concern toward handling the huge receivable situation of workshops, BSP-Nepal should consider drawing up a modality to make direct payments to factories or their dealers from where most workshops purchase GI pipes and steel raw materials, it could be a big support to the workshops.
- BSP-Nepal could improve subsidy claim processing and, rather than forwarding reports to AEPC once or twice a month, it should consider sending them more frequently irrespective of the number of forms received and number of plants of a company. The faster the subsidy released, the better it is for the working capital situation of the companies.
- A system of automatic annual agreement renewal should be considered for existing companies. The cancellation clauses in BSP-Nepal agreement should provide adequate ground to ensure that companies comply with the norms of the BSP.
- Much of the problem of working capital shortage is due to management deficiency of the companies themselves and the situation can be improved only by developing proper costing and financial management capacity and discipline of the companies. This can be done through training and motivation under the joint efforts of the companies, RBCCs, NBPG and BSP-Nepal.

.1. INTRODUCTION

BACKGROUND

Biogas Support Program (BSP) has been implemented in Nepal with the funding from the Directorate General for International Cooperation of the Netherlands (DGIS), the Netherlands government through the Netherlands Development Organization in Nepal (SNV/N). The Government of Nepal (GoN) and the Kreditanstalt fuer Wiederaufbau of Germany (KfW) also started funding the BSP from the Phase-III (March 1997 to June 2003). A total of 172,505 plants have been installed in 66 districts of Nepal till mid-July 2007 or end of FY 2063/64 BS. (*Source: BSP-N*) The target of 135,000 units (originally set at 200,000 units but later scaled down) of BSP Phase-IV (July 2003 to June 2009) is also a target envisaged in the Tenth Plan (mid-July 2002 to mid-July 2007) of the Nepalese government.

The Biogas Sector Partnership–Nepal (BSP-Nepal or BSPN), an NGO, is implementing the BSP Phase-IV with the financial and technical support from Alternative Energy Promotion Centre (AEPIC) and SNV/N. The subsidy component for BSP-IV has been co-funded by KfW, DGIS (through SNV) and GoN (through AEPIC). The biogas programme covers the Terai, hills and remote hills, and the subsidy is deployed according to this classification.

The revised overall objective of BSP-IV is to *further develop and disseminate biogas plants as a mainstream renewable energy solution in rural Nepal, while better addressing poverty, social inclusion and regional balance issues and at the same time ensuring enhanced commercialization and sustainability of the sector.*

The expected outputs of the BSP Phase-IV are:

1. Quality biogas plants construction in rural areas scaled up and their proper operation ensured.
2. Pro-poor orientation and outreach of the programme enhanced through applied research and studies for optimized designs, operation and benefits of the biogas technology.
3. Gender mainstreaming and social inclusion practices are applied in the programme.
4. Sectoral players strengthened for sustainable development of the biogas sector.
5. Systematic and sustainable progress made towards developing a commercially viable and market oriented biogas sector.
6. Mechanisms and capability strengthened for availability of micro credit facility to farmers for credit financing biogas plants in rural Nepal.
7. Biogas CDM (Clean Development Mechanism) projects developed, promoted and implemented to meet fund gap in the Phase IV and beyond.

RATIONALE FOR THE STUDY

A major concern of the BSP-Nepal lies in the systematic and sustainable progress made towards developing a commercially viable and market oriented biogas sector. BSP-Nepal has been working toward this through demand and supply driven approaches through

appropriate programmes for the biogas companies and the actual biogas customers who are mostly the economically weak rural farmers. In its attempt at institution building, BSP-Nepal has been instrumental in setting up the biogas producers group, the Nepal Biogas Promotion Group (NBPG), the regional biogas coordination committees (RBCC) as well as the biogas workshops, and has supported their capacity building.

BSP-Nepal has established technical standards meant to uphold the quality of biogas plants, and biogas companies are expected adhere to them. The plants are monitored and performance of companies is subject to a strict regime of evaluation. The quality of plants constructed is one major parameter of evaluation besides other parameters such as after sales service, training of farmers, logistics, target achievement etc. Since financial subsidy is utilized as a major intervention to stimulate the market, it is imperative that technically sound plants are constructed and farmers benefit from them. BSP-Nepal also tries to ensure that there is a fair competition among the companies and, at the same time, to ensure that farmers benefit in terms of fair prices for the plants for which they pay. For this, there has been the practice of approving the price quotation for biogas plants at the beginning of every fiscal year.

Working capital shortage is a major financial problem faced perennially by most of the biogas companies. This problem has led the companies into a vicious cycle of poor profitability, resource crunch, management deficiencies and limitations in capacity, and to further poor profitability. The working capital problem has not only impacted the overall operations of the companies, but also the biogas support programme. The ultimate results of the problem are poor management, unhealthy competition, unmet quantitative targets of the companies themselves, and the overall qualitative expectations of the biogas support programme.

a. Rationale for the Cost Survey

Lot of efforts are being made for creating a fairly competitive market situation, but one cannot ignore the reality of market imperfection in the biogas sector in the present state. In this context, it would not be appropriate to leave the pricing of biogas plants to the market forces alone, especially in a situation where the biogas customers, comprising of the rural farmers, are not aware of the quality and price of biogas components and services provided by the biogas companies. The practice of quotation approval at the beginning of every fiscal year has been a measure to ameliorate this situation for protecting the interest of such customers. Price quotation of plants for a fiscal year is proposed by NBPG that basically represent the interest of biogas companies. The quotations need to be reviewed and rationalized through an independent cost survey exercise.

b. Rationale for the Assessment of Impact of Advance Subsidy

Poor working capital situation of most companies has affected not only the companies but the programme as well. It has affected the achievement of plant targets and sustainable growth of the biogas sector in general. It was felt that a comprehensive intervention was needed to help companies break out of this financial problem ailing them. However, as a short term measure for making working capital available to companies, the biogas programme started an advance subsidy payment from fiscal year 2005/06. The advance subsidy payment is given at a rate of Rs. 2,000 per plant for plants constructed by individual companies in the previous fiscal year. To avail this facility, the companies must submit individual bank guarantees to cover the advance subsidy amount. The companies which cannot qualify for the advance subsidy get working capital support through NBPG in the form of credit at the time of purchase of appliances and

components. Such a credit facility is provided from a working capital fund made available to NBPG by BSP-Nepal. After the completion of two years, it has been felt necessary to carry out an assessment of impact of the advance subsidy payment to biogas companies and the working capital provision through availability of components or raw materials in credit.

OBJECTIVES

The study has of two separate objectives which are as follows:

- To undertake an annual cost survey to analyze the change in price of raw materials, labour, appliances, etc (including a lamp and pressure gauge) and to recommend a revised quotation for biogas plants for FY 2064/65 (2007/08 AD).
- To undertake an assessment of impact made by the provision of advance subsidy payment and by the provision of working capital for those companies, which could not get the advance subsidy.

METHODOLOGY

Relevant secondary data on prices and costs of materials and services, previous quotations of household biogas plants etc. were collected and reviewed. These, and information on advance subsidy payments and NBPG credit as well as companies receiving such payments were received from BSP-Nepal and NBPG.

A number of interviews and discussions were held with different biogas companies, workshops, hardware dealers or suppliers of materials and components for gathering information relevant to costs and prices. [Refer to *Annex 1: List of Persons Interacted With*] Cross checks were made on the cost factors through a number of sources. A general market survey was carried out of the prices of various hardware materials (GI pipe and pipe fittings and construction materials such as cement, bricks etc.) used in the construction of biogas plants in all the areas visited during the field visits including in Kathmandu.

Based on the cost survey, a price quotation was prepared for the fiscal year 2064/65 in the format that has been in use. Inflationary trend, transportation, discounts in retail prices etc. have been taken into consideration in preparing the quotation. The cost survey carried out last year was considered and compared to see the changes.

The data was collected through separate sets of questionnaires for the two groups. In the first stage, survey questionnaires were mailed to almost all the biogas companies that would not be covered during the field visits of the consultants. The field surveys of Pokhara, Butwal, Bharatpur, Birtamod, Itahari and Biratnagar were carried out to interact with various companies under the respective jurisdictions and gather information through the questionnaires. (It was decided to leave out Dhangadhi in the field survey as the RBCC there was relatively new.) As expected, the response rate through mail was very low, but the data of those biogas companies that did respond were also used for analysis. Altogether officials of 30 companies were met during the visits while 5 companies returned valid survey sheets through the mail. Interaction with some companies in Kathmandu and Banepa were done over the telephone. Survey of 10 workshops in those regions was also carried out. The field visit included meeting companies at respective RBCC offices in the respective areas for filling out the survey sheets as well as focussed

discussions. Some sample biogas companies were also visited to strengthen the study. [Refer *Annex 2: Biogas Survey Sheet (for Companies)* and *Annex 3: Biogas Survey Sheet (for Workshops)*]

Companies were grouped into four categories for the analysis of impacts of advance subsidy payments and NBPG credit on each category correlating with a number of variables based on the survey sheets. The categories are

- (i) companies receiving only advance subsidy payments,
- (ii) companies receiving only NBPG credit,
- (iii) companies receiving both advance subsidy payment and NBPG credit, and
- (iv) companies receiving neither advance subsidy payment nor NBPG credit.

The primary information regarding receivable and payable periods, inventory periods, were sought to work out the cash conversion cycle (CCC) to relate with working capital requirements. These were correlated with the companies receiving advance subsidy payments and NBPG credits.

Perception analysis was done utilizing the Likert scale to assess the separate responses of biogas companies and workshops on the impact of advance subsidy and NBPG credit on five different variables. The respondents were asked to respond separately in a Likert scale of 1 to 5 to each variable in the degree of their agreement that advance subsidy payment and NBPG credit

- will reduce loan amount
- will reduce price of plants
- will help in operations
- will help in increasing profit
- will eliminate need to take short-term loan

Regression analysis has been carried out to strengthen the impact analysis.

SCOPE AND LIMITATION

This study utilizes information based on field survey with samples in limited areas excluding the far western region. The survey has covered representative Terai and the hilly regions but not the remote mountain areas. Questionnaires sent to companies in remote areas were not returned, and thus it was not possible to cover them in the sample.

For simplicity and quick reference, the study has considered 6 m³ size plants only for the purpose of analysis since this size appeared to be the largest number of plants constructed.

It was not possible to analyze the trend of plant construction and see what percentage of that was due to the advance subsidy payment and due to the working capital simply because of lack of detailed data.

.2. COSTS AND PRICES OF PLANTS

From the point of view of BSP, it is important that customers/farmers benefit not only from technically sound biogas plants constructed at their households, but they should also benefit in terms of fair prices for the plants for which they pay. Most of the farmers are neither aware of the technical aspects nor the costs of different components that comprises a plant. Although there is market competition in the biogas sector, there are chances that customers may not get fair prices due to practices of price undercutting, price cartel, manipulations or any other form leading to price distortion. In this context, at the beginning of every fiscal year, the prices of biogas plants are determined by RBCCs and NBPG, and become effective only after the approval of BSP-Nepal. This way, BSP-Nepal tries to ensure that the farmers get a fair deal even in terms of prices.

The cost components of a biogas plant as highlighted in the NBPG annual quotation are categorized under

- construction materials and labour
- pipe and fittings
- appliances provided by company
- construction and supervision
- after sales service fees
- promotion and training
- service charge/ administrative cost

MATERIAL COST COMPONENTS

The prices of construction materials and pipe and fittings were collected through a survey of hardware markets of Pokhara, Kathmandu, Banepa, Butwal, Bharatpur, Itahari, Dharan and Biratnagar representing the hills and the Terai. Separate average prices have been worked out for the Terai and hill accordingly. Likewise, prices of workshop appliances were collected directly from the biogas workshops in Butwal, Bharatpur and Biratnagar. The price of main gas valve (Sanwa) was acquired from NBPG's subsidiary company, Nepal Renewable Energy Development Company P. Ltd. (NREDC). Only one set of average prices of workshop appliances and NBPG materials was taken.

Besides the general materials and components used in the biogas plants, the quotation of 2064/65 also includes the costs of pressure gauge and gas lamp as optional components.² The inclusion of pressure gauge and biogas lamp as a set in the biogas plant requires some additional fittings.³ Since the lamps were not commonly available in the market, its price was acquired from NBPG.

² The pressure gauge used in the biogas plant set is Bourden gauge type of meter that shows unit measures in Kilo-Pascal (kPa). The pressure gauge has been added in the set from the perspective of CDM to check possible gas leakage. Both Nepali and Indian biogas lamps are available in the market.

³ The inclusion of pressure gauge requires additional fittings like gas tap (1 pc.), nylon hose pipe (1 m) and GI ½" tee (1 pc.). The Indian gas lamp requires gas valve (1 pc.), GI ½" elbow and pipe (3 m). The gas valve however is not required for a Nepali lamp. The gas tap is manufactured by the biogas workshops.

Table 1: Analysis of Prices of Various Materials in Terai Region

	Unit	Average (Rs.)	Standard deviation (Rs.)	Minimum (Rs.)	Maximum (Rs.)	CV	No. of observations
Construction material							
Brick	1000	4690.00	594.64	3900.00	6000.00	13%	31
Sand	bag	23.59	3.22	15.00	28.00	14%	29
Gravel	bag	30.62	5.73	20.00	37.00	19%	29
Iron rod (8 mm)	kg	54.91	1.29	50.00	58.00	2%	39
Cement	bag	448.26	19.64	410.00	490.00	4%	43
Pipe and Fittings							
HDEP pipe ½"	m	28.15	2.20	25.00	35.75	8%	44
GI pipe ½" (6m)	pc	684.93	22.95	625.00	716.00	3%	48
GI socket ½"	pc	18.24	2.75	14.30	26.90	15%	49
GI elbow ½"	pc	19.88	3.43	16.00	29.10	17%	49
GI nipple ½" x 6"	pc	30.85	4.30	21.60	40.95	14%	49
GI Tee ½"	pc	32.44	4.60	25.58	47.00	14%	49
Teflon tape	pc	9.20	1.65	5.00	12.00	18%	47
Others by Company *							
Emulsion paint	ltr	130.28	30.48	100.00	225.00	23%	50
Nylon hose pipe	m	18.53	2.52	12.50	25.00	14%	50
HDEP pipe 4"	m	289.93	47.09	224.00	360.00	16%	46
GI nipple ½" x 2"	pc	11.12	2.59	7.20	18.20	23%	49
GI union ½"	pc	52.45	5.95	44.00	75.00	11%	49
Pressure gauge		231.54	38.86	150.00	255.00	17%	13
Lamp**		425.00		425.00	425.00	0%	1

*(except workshop appliances/main gas valves) **NBPG price

Table 2: Analysis of Prices of Various Materials in Hill Region

	Unit	Average (Rs.)	Standard deviation (Rs.)	Minimum (Rs.)	Maximum (Rs.)	CV	No. of observations
Construction material							
Brick	1000	4750.00	984.89	4200.00	6500.00	21%	5
Sand	bag	39.00	11.40	25.00	50.00	29%	5
Gravel	bag	59.00	5.48	50.00	65.00	9%	5
Iron rod (8 mm)	kg	56.91	2.95	54.50	65.00	5%	11
Cement	bag	455.38	12.49	440.00	480.00	3%	13
Pipe and Fittings							
HDEP pipe ½"	m	29.42	4.76	25.46	42.00	16%	14
GI pipe ½" (6m)	pc	703.80	37.35	647.00	769.00	5%	15
GI socket ½"	pc	21.93	2.57	18.83	26.10	12%	15
GI elbow ½"	pc	21.90	1.74	20.00	26.00	8%	15
GI nipple ½" x 6"	pc	34.55	3.30	25.00	38.22	10%	15
GI Tee ½"	pc	35.86	2.49	32.86	41.00	7%	15
Teflon tape	pc	12.91	3.86	7.00	20.00	30%	11
Others by Company*							
Emulsion paint	ltr	143.25	34.13	115.00	200.00	24%	11
Nylon hose pipe	m	18.00	0.00	18.00	18.00	0%	19
HDEP pipe 4"	m	286.86	25.33	241.00	320.00	9%	14
GI nipple ½" x 2"	pc	13.45	3.14	8.00	20.00	23%	15
GI union ½"	pc	68.80	12.25	50.00	85.00	18%	15

*(except workshop appliances/main gas valve)

The statistical analysis of prices of construction materials and pipe and fittings and other materials (other than workshop appliances) collected in the market survey of Terai and

hills are shown separately in *Table 1: Analysis of Prices of Various Materials in Terai Region* and *Table 2: Analysis of Prices of Various Materials in Hill Region* respectively.

The average market prices were adjusted for the purpose of the quotation to be prepared. (Refer *Table 3: Adjusted Prices of Materials for Terai and Hill*) In the average market prices taken separately for the Terai and hill, the adjustments include the addition of 3% transportation for Terai and hills, 5% inflation and 2% wastage to the prices of construction materials and pipe and fittings. The estimated increment in transportation cost should cover the cost of transporting various materials from hardware stores to the plant sites which is actually quite difficult to arrive at due to the differences in volume of goods, distance and mode of transportation. From interactions with representatives of biogas companies, it has been estimated that the average additional cost would be around 3%. Likewise, 2% wastage of materials is estimated at various stages of transportation, storage and use during construction. An approved quotation is effective for the whole year and companies are expected to strictly adhere to the prices during the period. Thus, an adjustment of 5% has been made to cover the inflation of prices during the year. This is the national average inflation rate. During the past year, the prices of GI pipe and construction materials have witnessed some increases in prices verging on the threshold of the quotation prices.

Table 3: Adjusted Prices of Materials for Terai and Hill

	Unit	Average market price (Rs.)		Adjusted prices for inclusion in quotation (Rs.)	
		Terai	Hill	Terai	Hill
Construction material					
Brick	pc	4.69	4.75	5.16	5.23
Sand	bag	23.59	39.00	25.94	42.90
Gravel	bag	30.62	59.00	33.68	64.90
Iron rod (8 mm)	kg	54.91	56.91	60.40	62.60
Cement	bag	448.26	455.38	493.08	500.92
Pipe and Fittings					
HDEP pipe ½"	m	28.15	29.42	30.96	32.36
GI pipe ½"	m	114.15	117.30	125.57	129.03
GI socket ½"	pc	18.24	21.93	20.07	24.12
GI elbow ½"	pc	19.88	21.90	21.87	24.09
GI nipple ½" x 6"	pc	30.85	34.55	33.93	38.01
GI Tee ½"	pc	32.44	35.86	35.68	39.44
Teflon tape	pc	9.20	12.91	10.12	14.20
Others by Company*					
Emulsion paint	ltr	130.28	143.25	143.31	157.58
Nylon hose pipe	m	18.53	18.00	20.38	19.80
HDEP pipe 4"	m	289.93	286.86	318.92	315.54
GI nipple ½" x 2"	pc	11.12	13.45	12.24	14.80
GI union ½"	pc	52.45	68.80	57.70	75.68
Pressure gauge	pc	231.54	231.54	255.00	255.00
Lamp	pc	425.00	425.00	468.00	468.00

*(except workshop appliances/main gas valve)

On the other hand, the prices of workshop appliances are the national average prices. The statistical analysis of the prices of workshop appliances are shown in *Table 4: Analysis of Prices of Workshop Appliances*. Only additional transportation costs of 3% for Terai and 5% for hills have been considered for this category of materials. Unlike the prices of other materials, no additional adjustments have been considered simply because there are fewer

chances of wastages in the appliances, and companies are assured of receiving appliances at annual prices more or less fixed with the workshops at the beginning of the fiscal year.

Table 4: Analysis of Prices of Workshop Appliances

Components	Average (Rs.)	Standard deviation (Rs.)	Minimum (Rs.)	Maximum (Rs.)	CV	No. of observations
Stove angle	464	29	395	510	6%	11
Mixture	676	41	560	700	6%	11
Dome gas pipe	444	37	350	500	8%	11
Water drain	125	15	100	160	12%	11
Gas tap	200	12	180	225	6%	11

As per practice, the prices have been worked out for Terai, Hill and Remote Hill. The prices of all materials and appliances for remote hill regions have been calculated at 10% increment from the prices for hill region to cover the transportation. The summary of unit costs of all materials for Terai, Hill and Remote Hill proposed for the 2064/65 quotation is presented in *Table 5: Proposed Costs of Materials for Quotation*.

Table 5: Proposed Costs of Materials for Quotation

Particulars	Unit	Market price (Rs.)		
		Terai	Hill	Remote Hill
Construction materials				
Brick	pc	5	5	6
Sand	bora	26	43	47
Gravel	bora	34	65	71
Iron rod (8 mm)	kg	60	63	69
Cement	bag	493	501	551
Pipe and Fittings				
GI pipe ½"	m	126	131	145
GI socket ½"	pc	20	25	27
GI elbow ½"	pc	22	25	27
GI nipple ½" x 6"	pc	34	39	43
GI Tee ½"	pc	36	40	44
Teflon tape	pc	10	14	16
Appliances provided by company				
Stove angle	pc	478	487	536
Mixture	pc	697	710	781
Inlet pipe	m	79	80	88
Dome gas pipe	pc	457	466	512
Gas tap	pc	206	210	230
Water drain	pc	129	132	145
Main gas valve (Sanwa)	pc	294	299	329
Emulsion paint	ltr	157	160	176
Nylon hose pipe	m	20	20	22
Pressure gauge/lamp set	set	656	656	721
For plants using HDEP pipe				
HDEP pipe ½"	m	31	32	36
GI pipe ½"	m	126	131	145

OVERHEADS AND OTHER COSTS

The construction and supervision costs cover the salary or piece-rate cost given to masons for the construction of plants. The modality of payment to masons may vary from piece-rate to a combination of monthly salary and piece-rate. The amount varies according to the size of the plant and type of plant (brick-made or stone-made) and region where plant is constructed. Normally, it takes 7 days to construct a brick plant of 4 and 6 cu. m. and 9 days for 8 cu. m. and 10 cu. m. sizes. It takes about 10 days and 12 days for those respective sizes. The mason's labour charges vary from Rs. 1100 to Rs. 1500. An average of Rs. 1350 is paid for a 6 cu. m. in addition to allowances for food and transportation which again may vary from company to company. This, along with technical services (or supervision), may add up from Rs. 2200 to Rs 3200.

It was found that the construction and supervision costs approved for the 2063/64 were valid for the 2064/65 quotation as well. Thus, the same amounts ranging upwards from Rs. 2200 have been considered for that category of cost.

The after sales service charge of Rs. 600 has been maintained. The training and promotion cost of Rs. 150 has been considered against the previous year's amount of Rs. 100. It was mentioned that the training and promotion cost had been increased to Rs. 150 by BSP-Nepal. As it is, these two categories of charges are supplemented by the programme which the companies are expected to spend under the respective heads.

The company service charge or administrative costs are calculated as 50% of the total of material costs borne by the company (pipes and fittings and appliances provided by company) and technical and supervision costs.⁴ It was felt that the company overheads would adequately cover rest of the operating costs of the company.⁵

[Refer to *Annex 4: Proposed BSP Quotation for 2064/65 (for GI Pipe)* and *Annex 5: Proposed BSP Quotation for 2064/65 (for HDEP Pipe)*]

PRACTICE OF QUOTATION PREPARATION BY NBPG

It has been observed that the quotation preparation by NBPG is done in an arbitrary manner, taking for granted that there has to be an annual 'increase' in the different cost headings without specific criteria to base the increases or mark-ups.⁶ The quotation preparation committee in NBPG is bestowed with the authority to make the final quotation on behalf of the biogas companies. The prices of various materials are solicited from each RBCC and interested individual companies. RBCCs in turn seek prices of appliances from workshops in their regions, and market prices of materials, transportation costs and overheads are calculated on ad hoc basis. While some companies provide active inputs in preparation of quotations for their respective regions, the majority are neither aware of nor consulted for the process. The workshops attempt to offer common price lists although some workshops are in the position to sell at lower prices.

⁴ This 50% gross margin has been benchmarked with that of PV Solar Home System.

⁵ Although it was not within the scope of work to calculate the office overheads, it would not have been possible to do so accurately even if one wanted to because most companies do not maintain proper book of accounts.

⁶ There is general understanding that the market prices of hardware materials at the time of quotation preparation cannot be taken seriously as that is the lean time, and their prices would increase after Dashain season.

Prices and costs collected from RBCCs are consolidated and NBPG tries to strike a balance to satisfy all the regions. There is the practice of appending high mark-ups in the cost headings of materials as a way of covering the overheads of the companies rather than showing higher overheads under one heading of company service charge or administrative costs. According to some committee members, the mark-ups are also meant to absorb the actual technical and supervision costs which are higher than that shown under the particular cost heading.⁷

⁷ There is a general feeling that the prices of materials for the current year are bound to increase after the constituency assembly elections, and that the current market prices of various materials have been artificially controlled by the 'interim' government through a populist 'interim' budget meant to appease the public.

.3. **WORKING CAPITAL SUPPORT**

A total of 17,663 numbers of plants have been constructed in 2063/64. The construction by 66 companies ranges from the highest of 2,236 plants to a lowest of only 1 plant. The top ten companies alone have constructed 9,526 plants (or 54% of total)⁸, 67% by the top 15 and 75% by the top 20 companies. (*Source: BSP-Nepal*) The average plant per company is 266. With a targeted 26,000 plants for 2007, there is a shortfall of about 8,500 plants in the year alone. Such a target cannot be achieved unless the companies increase their production capacity. This is very wanting among the smaller companies. More than two thirds of the companies have constructed an average of 95 plants. 14 companies have constructed less than 50 plants. In an apparent bid to boost up the institutional capacity of the companies, BSP-Nepal has required that each branch should be equipped with a minimum level of physical office assets and manpower and that it should produce at least 50 plants. This is purportedly for the well-being of the biogas companies themselves, and which also obliquely supports the quantitative target of the sector program. However, such regulations may not support targets if companies are bogged down by financial constraints. Working capital shortage has been identified as the prominent problem among the different problems faced by the companies resulting in low plant number and financial efficiency.

WORKING CAPITAL PROBLEM

Working capital shortage is a major financial problem faced perennially by most of the biogas companies. This problem has led the companies into a vicious cycle of poor profitability, resource crunch, management deficiencies and limitations in capacity, and to further poor profitability. The working capital problem has not only impacted the overall operations of the companies, but also the biogas support programme in general. The ultimate results of the problem are poor management, unhealthy competition, unmet quantitative targets of the companies themselves, and the overall qualitative expectations of the biogas programme.

Poor working capital situation has affected the achievement of plant targets set by themselves for most companies even constraining their efforts at breaking even. Almost all companies have to resort to short term loans, that too, mostly from private lenders at high interest rates. Many operate at small levels, at under-capacity and under poor resource and institutional-base. Because of one or more of these factors, they either have no access to or simply shy away from formal lending institutions, and are bound to rely on private lenders for meeting their working capital requirements at incredibly high interest rates⁹. Since most dealers of pipe and fittings do not trust these types of companies enough to allow credit facility, many companies have to buy materials on cash terms. Most workshops belonging to biogas companies do not give appliances on credit, or, even if they do, it is for short periods only. Besides, they also have other overheads to cover.

⁸ The top 10 companies are RGG (2036), GGC (1677), BBI (1050), PGG (885), RAP (860), GPC (682), PED (670), MEC (633), ANB (546) and MGC (487).

⁹ Despite the linkage of the programme with a number of micro-finance institutions, small companies have not been able to get the real benefit of the micro-credit system.

As with most businesses, hardware traders allow discounts and some credit facility to their clients. But obviously, the amount of discount available is dependent on the bulk purchase and cash paying capacity of buyers, while the availability of credit period depends on their credibility. For example, Hulas branded (considered to be the best) ½” GI pipes are available at 2% to 7% discounts depending on retail or bulk purchase. Likewise, ½” GI pipe fittings are available for up to 50% discount. Discounts for ½” HDEP (NS mark) pipes range from 5% to 10%. On top of these, despite the claims of biogas companies, two to three-month credit facilities are also available from hardware dealers. However, many companies cannot benefit from such facilities due to the problem of working capital. Larger companies may afford to buy in wholesale directly from the factory or dealers, but smaller companies have to buy from retailers which provide very small or no discounts. The companies could also benefit from advance purchases at lower prices during lean season if they had adequate resources.

Companies also face shortage of capital due to lack of reimbursement of subsidy on time. Some companies are of the opinion that BSP-Nepal is also partly responsible for the working capital problem of the companies. According to them, subsidy release by AEPC is rather time consuming and, thereby, substantial amounts gets locked up. Some of the reasons attributed to this are the ‘slow’ report processing at BSP-Nepal and AEPC, and BSP-Nepal’s practice of forwarding subsidy claim forms to AEPC in lots of 500 forms only per month¹⁰, the Ashadh 15 (June-end) deadline for submission of reports¹¹ etc.

They also attribute BSP-Nepal’s delay in entering into annual agreement with companies as another reason.¹² The delay makes it difficult for companies to approach banks for loans for the new fiscal year as banks demand for the agreement. The delay in agreement may have been caused by delay in quotation finalization, delay in verification of plants by BSP-Nepal, delay in report processing etc. which, as mentioned earlier, also results in delay in release of subsidy amounts.¹³

Apart from the companies that construct biogas plants, workshops (especially those not owned by biogas companies) seem to be the worst hit by the problem of working capital, and are always struggling to make their operations smooth because most of them are entirely dependent on the biogas companies as their customers. Even the other companies that construct plants and also operate workshops restrict their production for their consumption only and operate their workshops on under-capacity. The working capital problem of the companies reverberates all the way to these workshops as well. The workshops face the same plight as the companies do in their purchase of raw materials (iron rods, pipes, brass etc.), equipments and buying services (galvanizing) to produce various appliances. They also lose on the benefits of bulk purchase, credit, discount etc. In such a position, workshops can not give timely delivery to those companies not making payments on time. Workshops face huge receivables as biogas companies reportedly take

¹⁰ Reports of some companies that were submitted at a certain date of a month had to wait for another month for processing because they could not be accommodated in the 500 lot of that particular month.

¹¹ The deadline of Ashadh 15 may have been set to facilitate administrative work at BSP-Nepal, but it appears to have restricted subsidy release of a number of additional plants whose reports, according to some companies, could have been submitted within the FY. However, BSP-Nepal has its own limitation, and moans the practice of companies submitting the bulk of their reports only towards the end of fiscal year.

¹² Because of the involvement of government subsidy in the BSP, there is a practice of annual agreement between individual companies and BSP-Nepal at the beginning of fiscal year. The agreement is subject to completion of activities like plant verifications, company evaluation, grading and other requirements etc.

¹³ The delay in agreement, which sometimes takes place in Mangshir (November-December) or even later, is also one reason for some companies/branches not being able to fulfil their targets, and for many, the 50-plant target.

long periods (as long as a year by some companies) to make the payments. The companies make excuses by pointing at 'late subsidy receipt' from AEPC. The workshops are at the mercy of these companies, and have to continue supplying them further to recover the previous receivables. This is the one big reason for biogas companies also operating workshops reluctant to supply workshop appliances to other companies. They would rather operate under-capacity than cope with huge receivables from other companies.

Workshops are equally important component of the biogas programme. In fact, apart from appliances and components for biogas plants, workshops can produce many other components and structures for domestic, industrial and other commercial products. In other words, with good management and entrepreneurship, workshops do not have to depend on producing appliances for biogas plants alone for their business. With additional effort, they can even venture on plant construction if they wanted to. However, despite the workshops being an integral part of the biogas programme, there is a feeling among them that the biogas programme has not paid adequate attention to them especially in mitigating their working capital problem. BSP-Nepal, on the other hand, may have its own stance that the workshops are capable or should be capable of sustaining on their own without any intervention in their credit management affairs.

BSP WORKING CAPITAL SUPPORT

Advance Subsidy Payment

In this backdrop, the biogas programme started a novel intervention for making external funds available to the companies which could be used for working capital. Toward this, the programme initiated the advance subsidy payment scheme for biogas companies since 2005/06 (2062/63 B.S.). The advance subsidy payment is given in the beginning of fiscal year at a rate of Rs. 2,000 per plant for plants constructed by individual companies in the previous fiscal year. The actual subsidy amounts¹⁴ are paid to companies based on their final reports of plant construction and subsequent documentary verification, and random physical verification of plants by BSP-Nepal. This interest free advance amount constitutes about 30% of the actual subsidy amounts considering the average plants of 4 and 6 cu. m. size built in the Terai and Hill regions. The advance subsidy payment is made against individual bank guarantees for equivalent amounts submitted by the companies. For companies that cannot submit bank guarantees, working capital support has been designed in the form of credit which they get through NBPG at the time of purchase of various appliances and components for the plants. This has been made possible through a working capital revolving fund made available to NBPG by BSP-Nepal.¹⁵

This short term financial support provides companies with access to capital at relatively low financial cost. The advance subsidy payment is made after determining the number of eligible plants for individual companies in the beginning of fiscal year, while its reimbursement is made at the time of actual subsidy payments for the plants constructed during the year as companies submit their reports. The advance subsidy payment also functions as a pressure on companies to meet the targets sets by them. If the target is not

¹⁴ The subsidy rates for Terai, Hill and Remote Hills are Rs. 6,500, Rs. 9,500 and Rs. 12,500 respectively for 4 and 6 cu. m. size plants and Rs. 6,000, Rs. 9,000 and Rs. 12,000 respectively for 8 and 10 cu. m. size plants.

¹⁵ Out of a total amount of Rs. 47 lakh set for the revolving fund, Rs. 20 lakh has already been given to NBPG on free interest. More amounts will be transferred as the fund is brought into more effective use.

met, the advance subsidy payment received in the beginning has to be returned on the basis of the difference in number of plants. One of the conditions of BSP in providing the advance subsidy payment is that companies increase their plant production by 20%.¹⁶ Eligible companies have already considered this advance subsidy payment as an important source of capital in their annual financial planning.

NBPG Credit

On the other hand, the working capital credit through NBPG has not been effectively utilized as conceived. At present, the amount is used to purchase main gas valves and other items like emulsion paint, plastic hose pipe and biogas lamps directly from NBPG. Altogether, about Rs. 17 lakh worth of goods has been taken (by various 26 companies that have not taken advance subsidy) from NBPG during 2063/64. (*Source: NBPG*) Among these, the main gas valve constituted the largest single component amounting to Rs. 12 lakh. Except for the approved main valve which is available only at NBPG (through NRDEC), companies are free to purchase the other goods from anywhere they choose. These items were purchased on credit by the companies but without any definite modality of recovery.¹⁷

The NBPG credit scheme was conceived to make outright payment to workshops by NBPG on the purchase of different appliances by individual companies. For this service rendered to the companies, NBPG would levy a 5% service charge to cover its administrative costs. This involves individual agreements for credit between companies and workshops. NBPG would be reimbursed the credit amounts by AEPC on the recommendation of BSP-Nepal by deducting the amounts at the time of subsidy release for plants constructed by the concerned companies. This would have been a tremendous support to the workshops as they would receive their payments within a short period of time and improve their working capital management. With the same modality, the NBPG credit could also be utilized to purchase other raw materials like pipes and fittings from different suppliers.

IMPACT ANALYSES OF WORKING CAPITAL SUPPORT

From the survey of different biogas companies, 35 companies that gave positive response were grouped into four categories for analyses:

- companies only receiving advance subsidy payment from AEPC
- companies only receiving goods on credit facility from NBPG¹⁸
- companies receiving both advance subsidy payment and goods in NBPG credit
- companies receiving neither advance subsidy payment nor NBPG credit facility

¹⁶ Despite all seriousness, many companies found it difficult to achieve the 20% increment in their plant production in the year mainly due to reasons of political unrest especially in the Terai at the peak season (Magh/Falgun), problem of raw material import from the Birgunj-Pathliaya corridor, and little support to supplement the targets from branches in western Nepal due to the Tharu movement etc.

¹⁷ The survey of different companies reveals that there are companies that have received AEPC advance subsidy payment as well as credit facility from NBPG. It appears that NBPG provides a certain period of credit to any company that purchases goods from NBPG. This may not have been conceived in the general credit scheme to support those companies that do not qualify for advance subsidy payment.

¹⁸ This is a general credit provided in the purchase of goods from NRDEC, and is not the support facility conceived in the working capital support modality through the working capital revolving fund provided to NBPG by BSP-Nepal.

Analyses are done on the basis of the four categories.

The following *Table 6: Cross-tabulation of Advance Subsidy Payment and NBPG Credit* highlights the number of companies in the four categories. 9 companies received both advance subsidy and NBPG credit, 7 received advance subsidy but not NBPG credit, 13 received NBPG credit but not advance credit, and 6 companies receiving neither. Out of the total samples, only 16 companies have received advance subsidy.

Table 6: Cross-tabulation of Advance Subsidy Payment and NBPG Credit

		NBPG Credit		Total
		No	Yes	
Advance Subsidy	No	6	13	19
	Yes	7	9	16
Total		13	22	35

Table 7: Analysis of Different Variables

Company Categories			Permanent staffs	Temporary staffs	Annual plant capacity	No. of plants in stock	2064/65 (targeted)
Neither advance subsidy nor NBPG Credit	N	Valid	6	6	6	6	4
		Missing	0	0	0	0	2
	Mean		6.17	11.50	237.50	48.33	205.00
	Std. Deviation		1.17	3.94	37.91	51.54	82.76
	Minimum		5	5	200	10	100
	Maximum		8	15	300	150	300
Only advance subsidy	N	Valid	7	7	7	7	7
		Missing	0	0	0	0	0
	Mean		22.29	43.71	678.71	194.29	717.29
	Std. Deviation		32.82	70.04	859.11	358.54	1013.77
	Minimum		3	3	200	25	250
	Maximum		95	200	2600	1000	3000
Both advance subsidy and NBPG Credit	N	Valid	9	8	9	9	8
		Missing	0	1	0	0	1
	Mean		28.33	69.50	716.67	126.11	808.13
	Std. Deviation		21.08	71.32	379.97	156.80	377.72
	Minimum		5	4	250	20	250
	Maximum		57	200	1200	500	1300
Only NBPG Credit	N	Valid	13	13	13	13	13
		Missing	0	0	0	0	0
	Mean		9.54	17.00	297.31	34.23	292.77
	Std. Deviation		10.09	15.51	242.18	24.57	235.54
	Minimum		2	4	20	10	125
	Maximum		40	50	900	100	900

Table 7: Analysis of Different Variables highlights the statistical average number of permanent staffs and temporary staffs, the average annual plant construction capacity, the material stock maintained by the companies and the estimated number of plants to be constructed during FY 2064/65 by companies in relation to receipts of advance subsidy payment and NBPG credit facility. The analysis shows that companies receiving advance

subsidy have higher average number of permanent and temporary staffs compared to those not receiving the advance subsidy. Likewise, those companies also have higher capacity to maintain stocks, higher production capacity, and have set higher targets for this year. These show that such companies have bigger institutional capacity than those companies not capable to put forward bank guarantee required being eligible for advance subsidy.

Table 8: Trend of Plant Construction

Company Categories		2060/61	2061/62	2062/63	2063/64	2064/65 (targeted)
Neither advance subsidy nor NBPG credit	N Valid	5	5	6	6	4
	Missing	1	1	0	0	2
	Mean (plants)	131.40	153.40	139.00	143.17	205.00
	Std. Deviation	28.34	59.34	47.13	40.10	82.76
	Minimum	100	80	75	77	100
	Maximum	163	212	187	181	300
Only advance subsidy	N Valid	6	7	7	7	7
	Missing	1	0	0	0	0
	Mean (plants)	397.67	482.71	488.14	468.43	717.29
	Std. Deviation	721.55	800.06	780.32	701.22	1013.77
	Minimum	70	90	75	111	250
	Maximum	1869	2288	2245	2044	3000
Both advance subsidy and NBPG Credit	N Valid	8	8	8	9	8
	Missing	1	1	1	0	1
	Mean (plants)	524.13	589.50	495.00	565.56	808.13
	Std. Deviation	282.56	270.04	313.50	317.14	377.72
	Minimum	128	176	44	163	250
	Maximum	976	981	951	1066	1300
Only NBPG Credit	N Valid	7	12	12	13	13
	Missing	6	1	1	0	0
	Mean (plants)	78.57	142.08	159.75	190.15	292.77
	Std. Deviation	56.36	116.19	159.21	157.04	235.54
	Minimum	17	34	50	48	125
	Maximum	194	342	576	486	900

Plant construction has steadily increased in the four years from 2060/61 to 2063/64 and companies have targeted higher number for 2064/65 as seen in *Table 8: Trend of Plant Construction*. The number of plants is definitely higher for those companies receiving advance subsidy, and the average is about three times higher than that of companies not receiving the facility. The category of companies receiving both advance subsidy and NBPG credit has scored higher than those receiving advance subsidy only. The category of companies only receiving credit from NBPG have higher number of plant construction in the last three years compared to those receiving neither advance subsidy nor NBPG credit although the former category companies have shown smaller minimum number of plant construction than the latter.

Table 9: Yearly Amount of Advance Subsidy and NBPG Credit presents the amount of advance subsidy and/or NBPG credit received by the four categories of companies. The amounts have been shown for 2062/63 and 2063/64 respectively. However, the four categorizations are based on receipt or non receipt of advance subsidy payment and/or NBPG credit in the fiscal year 2063/64.

Table 9: Yearly Amount of Advance Subsidy and NBPG Credit

Company Categories			Advance subsidy		NBPG credit	
			2063/64	2062/63	2063/64	2062/63
Neither advance subsidy nor NBPG Credit	N	Valid	0	1	0	0
		Missing	6	5	6	6
	Mean (Rs)			302,000		
	Minimum			302,000		
	Maximum			302,000		
Only advance subsidy	N	Valid	7	4	0	0
		Missing	0	3	7	7
	Mean (Rs)		925,143	1,216,500		
	Minimum		60,000	42,000		
	Maximum		4,490,000	4,576,000		
	Std. Deviation		1,586,287	2,240,815		
Both advance subsidy and NBPG Credit	N	Valid	9	4	9	6
		Missing	0	5	0	3
	Mean (Rs)		692,522	936,250	167,028	138,333
	Minimum		6,500	83,000	30,000	50,000
	Maximum		1,900,000	1,962,000	394,000	285,000
	Std. Deviation		685,518	870,876	115,218	91,688
Only NBPG Credit	N	Valid	0	1	13	8
		Missing	13	12	0	5
	Mean (Rs)			5,800	64,790	60,000
	Minimum			5,800	1,500	15,000
	Maximum			5,800	160,000	125,000
	Std. Deviation				51,852	38,359

Table 10: Views of Companies on Impact of Advance Subsidy

Company Categories			Will reduce loan amount	Will reduce price of plants	Will help in operations	Will help in increasing profit	Will eliminate need to take short-term loan
Neither advance subsidy nor NBPG Credit	N	Valid	5	4	5	5	5
		Missing	1	2	1	1	1
	Mean		5.00	3.25	4.60	3.40	4.80
	Std. Deviation		0	1.50	.55	1.34	.45
Only advance subsidy	N	Valid	6	6	7	6	6
		Missing	1	1	0	1	1
	Mean		4.83	2.83	4.71	4.33	4.17
	Std. Deviation		.41	.98	.49	.52	.75
Both advance subsidy and NBPG Credit	N	Valid	9	9	9	9	8
		Missing	0	0	0	0	1
	Mean		4.78	2.89	4.56	4.33	4.13
	Std. Deviation		.44	1.17	.53	.50	.83
Only NBPG Credit	N	Valid	12	12	12	12	12
		Missing	1	1	1	1	1
	Mean		3.75	2.25	4.33	3.75	4.25
	Std. Deviation		1.60	1.60	1.37	1.36	1.36

The respondents were asked to state their agreements on levels of various impacts of advance subsidy on a Likert scale of 1 to 5 (1 for disagreement and 5 for total agreement). The response of companies to five impacts of advance subsidy as shown in *Table 10: Views of Companies on Impact of Advance Subsidy* illustrates, in principle, that majority of them unanimously agree that the advance subsidy has positive impact on reducing the amounts of loans taken, facilitating daily operations, and avoiding the need to take short term loans. Since companies are bound to adopt NBPG quotations, they do not agree that advance subsidy has a major role in reducing the prices of plants. Likewise, they agree that advance subsidy has, to some extent, a positive impact on their profitability. Here, the responses to different parameters are quite uniform across different categories of the companies grouped in.

Table 11: Views of Companies on Impact of NBPG Credit

Company Categories			Will reduce loan amount	Will reduce price of plants	Will help in operations	Will help in increasing profit	Will eliminate need to take short-term loan
Neither advance subsidy nor NBPG Credit	N	Valid	5	4	5	4	6
		Missing	1	2	1	2	0
		Mean	3.40	2.00	4.00	3.25	3.83
		Std. Deviation	1.82	1.41	.71	1.71	1.47
Only advance subsidy	N	Valid	6	6	7	6	6
		Missing	1	1	0	1	1
		Mean	4.67	2.83	4.43	4.00	3.67
		Std. Deviation	.52	.98	.53	.63	.52
Both advance subsidy and NBPG Credit	N	Valid	9.	8	9	9	9
		Missing	0	1.00	0	0	0
		Mean	4.44	2.75	4.33	3.89	4.22
		Std. Deviation	.53	1.04	.50	.93	.83
Only NBPG Credit	N	Valid	12	12	12	12	11
		Missing	1	1	1	1	2
		Mean	4.25	2.17	4.08	3.50	4.00
		Std. Deviation	1.36	1.11	1.68	1.31	1.55

On a similar note, utilizing the Likert scale, companies stated their views on the positive impact of NBPG credit on the companies on the same parameters as that of advance subsidy. The response was almost similar as in the previous table as shown in *Table 11: Views of Companies on Impact of NBPG Credit*. However, the general opinion is that the present level of NBPG credit amount, being smaller, cannot fully support companies to the extent of having to do away with short term loans. Again, in principle, the responses are quite positive to four parameters except for the impact on reducing the prices. The feeling is that the credit has some impact on the costs, but the companies cannot reduce the prices. By and large, companies receiving advance subsidy have indicated greater agreements to the different parameters as against those not receiving advance subsidy.

Table 12: Loan Repayment Period

Company Categories			
Neither advance subsidy nor NBPG Credit	N	Valid	3
		Missing	3
	Mean (days)		142
	Std. Deviation (days)		193
Only advance subsidy	N	Valid	6
		Missing	1
	Mean (days)		159
	Std. Deviation (days)		113
Both advance subsidy and NBPG Credit	N	Valid	8
		Missing	1
	Mean (days)		209
	Std. Deviation (days)		151
Only NBPG Credit	N	Valid	11
		Missing	2
	Mean (days)		183
	Std. Deviation (days)		128

Table 12: Loan Repayment Period shows the average loan repayment period of the companies (for 2063/64) varies from 142 days (category of companies receiving neither advance subsidy nor NBPG credit) to 209 days (category of companies receiving both facilities) with high standard deviations. While almost all respondents have had to resort to external loans on interest, half of the first category companies did not respond to the query on loan period. These companies operate at small levels and they either do not take the risk or cannot pledge any assets as collateral for loans.

Table 13: Rate of Interest and Annual Loan Amounts

Company Categories		Interest Rate (2063/64)	Loan Amount					
			2060/61	2061/62	2062/63	2063/64	2064/65	
Neither advance subsidy nor NBPG Credit	N	Valid	2	2	2	2	2	
		Missing	4	4	4	4	4	
	Mean (Rs)		11.75	850,000	850,000	470,000	975,000	975,000
	Std. Deviation (Rs)		4.60	494,975	494,975	593,970	671,751	671,751
Only advance subsidy	N	Valid	7	4	6	7	7	7
		Missing	0	3	1	0	0	0
	Mean (Rs)		16.43	930,000	816,667	684,643	789,286	1,381,429
	Std. Deviation (Rs)		6.88	1,385,015	1,332,917	1,246,539	1,422,429	1,889,349
Both advance subsidy and NBPG Credit	N	Valid	9	7	7	7	7	8
		Missing	0	2	2	2	2	1
	Mean (Rs)		18.94	528,571	614,286	757,143	1,573,143	1,193,750
	Std. Deviation (Rs)		10.10	381,725	491,354	528,700	2,083,990	842,800
Only NBPG Credit	N	Valid	11	2	6	7	9	5
		Missing	2	11	7	6	4	8
	Mean (Rs)		15.82	77,500	279,167	200,000	341,667	1,180,000
	Std. Deviation (Rs)		8.15	3,535	220,463	224,072	457,233	2,137,931

The average rate of interest on loans taken by companies varies greatly as shown in *Table 13: Rate of Interest and Annual Loan Amounts*. Most of the companies rely on taking

loans at high interest rates from cooperatives or personal individual lenders. Loan amounts have been increasing in all the four categories of companies, but companies receiving advance subsidy resort to loans at higher interest rates than that not receiving advance subsidy. The average loan amount per company is expected to exceed Rs. 10 lakh in FY 2064/65. Growth in loan amounts in principle indicates positive functioning of the biogas sector. The categories of companies receiving advance subsidy expect to seek higher loans irrespective of the advance subsidy they have been receiving or will be receiving this fiscal year. This could indicate that these companies will be expanding their business further and the advance subsidy amount they receive does not fully support their expansion plans.

Table 14: Annual Rent and Salaries

Company Categories		Rent	Salaries
Neither advance subsidy nor NBPG Credit	N	6	6
	Valid		
	Missing	0	0
	Mean (Rs)	65,000	328,600
	Std. Deviation (Rs)	52,678	187,229
Only advance subsidy	N	7	7
	Valid		
	Missing	0	0
	Mean (Rs)	105,200	543,250
	Std. Deviation (Rs)	128,162	479,750
Both advance subsidy and NBPG Credit	N	9	9
	Valid		
	Missing	0	0
	Mean (Rs)	152,300	872,200
	Std. Deviation (Rs)	191,214	831,154
Only NBPG Credit	N	13	13
	Valid		
	Missing	0	0
	Mean (Rs)	56,583	516,917
	Std. Deviation (Rs)	65,972	710,490

The average annual rent and salary amounts for 2063/64 of the category of companies receiving advance subsidy are higher than that of companies not receiving advance subsidy as seen in *Table 14: Annual Rent and Salaries*. These overheads are consistent to the plant capacity size of the companies of the particular category. The rent and salary amounts include overheads of head offices and different branches of the biogas companies.

Table 15: Satisfaction Level

Company Categories	N	Mean	Std. Deviation
Neither advance subsidy nor NBPG Credit	6	3.67	.82
Only advance subsidy	7	3.14	.69
Both advance subsidy and NBPG Credit	9	3.00	.50
Only NBPG Credit	13	3.85	.80
Total	35	3.46	.78

The response to the level of satisfaction with the biogas business on a Likert scale of 1 to 5 (1 for very dissatisfied and 5 for very satisfied) indicates that the scale tilts slightly towards satisfaction level. (Refer *Table 15: Satisfaction Level*) This may, however, be interpreted as companies being neither satisfied nor dissatisfied with the biogas business

as expressed by the companies especially, and surprisingly, by categories of companies receiving advance subsidy. This may be a disturbing factor for the biogas sector.

Table 16: Collections, Inventory and Payables

		Average collection period	Subsidy collection period	Inventory period	Average pay period (pipes & fittings)	Average pay period (appliances & materials)
N	Valid	33	35	33	21	29
	Missing	2	0	2	14	6
	Mean (days)	23.00	42.29	34.27	30.57	61.59
	Std. Deviation (days)	16.51	21.70	19.56	24.79	40.39

Table 16: Collections, Inventory and Payables shows the average receivable period from farmers is 23 days while subsidy is received from AEPC in 42 days. The average inventory period is 34 days. The average payment period for pipes and fittings is 31 days, whereas payments for workshop appliances and other materials like main gas valve etc are made in 62 days. The period of payment to workshops (62 days) mentioned above by companies is far shorter than the collection period (256 days) mentioned by workshops.

ANALYSES OF IMPACT ON WORKSHOPS

The following analyses are based on the survey of 10 biogas workshop companies in Butwal, Bharatpur, Biratnagar and Banepa.

Table 17: Production Capacity of Workshops

	N	Minimum	Maximum	Mean	Std. Deviation
Capacity to produce appliances for sets of biogas plants	10	1,000	7,000	3,250	1,845
Valid N (list-wise)	10				

The average capacity of workshops in terms of production of sets of appliances for biogas plants is 3250 as shown in *Table 17: Production Capacity of Workshops*. The size of the workshops is evident from the maximum and minimum capacities.

Table 18: Credit, Receivables, Sales and Guarantee of Workshops

	N	Minimum	Maximum	Mean	Std. Deviation
Credit period (days)	7	1	360	112	124
Receivable period (days)	7	90	410	256	151
Sales - minimum lot (Rs)	8	2,000	50,000	24,250	22,531
Sales - maximum lot (Rs)	8	40,000	500,000	186,875	142,552
Guarantee period (days)	10	365	1825	511	462
Valid N (list-wise)	7				

The average credit allowed by workshops is 112 days but the average period of receipt of payments from biogas companies goes to 256 days, more than twice the credit period given by them as shown in *Table 18: Credit, Receivables, Sales and Guarantee of Workshops*. Surprisingly, compared to the lower payment period for pipe and fittings of hardware traders/companies, biogas companies invariably have casual dealing with the biogas workshops when it comes to payments for appliances bought from the latter.

Depending on the season and the capacity, the biogas companies purchase appliances worth a minimum of Rs. 2,000 to Rs. 40,000 and a maximum of Rs. 50,000 to Rs. 500,000 at one lot from the workshops. This means, in the worst condition, the average sale amounts to Rs. 24,250 while, in favourable condition, the sale increases to as much as Rs. 186,875. The guarantee period for appliances and components produced by workshops ranges from one year to five years, but the average period is around one year and 5 months.

Table 19: Views of Workshops on Impact of Advance Subsidy Payments to Companies

Views	N	Mean	Std. Deviation
Will reduce loan amount	9	3.00	1.73
Will reduce price of plants	9	3.00	1.80
Will help in operations	10	3.20	1.93
Will help in increasing profit	9	2.89	1.83
Will eliminate need to take short-term loan	10	3.10	1.85
Valid N (list-wise)	7		

The workshop respondents were asked to state their agreements on levels of various impacts on the workshops by the provision of advance subsidy to biogas companies on a Likert scale of 1 to 5 (1 for disagreement and 5 for total agreement). The impacts were on the same five parameters as asked to biogas companies. *Table 19: Views of Workshops on Impact of Advance Subsidy Payments to Companies* illustrates that majority of them neither agrees nor disagrees that the provision of advance subsidy to biogas companies has or will have any positive impact on them. They do not believe that companies have in anyway changed their style of payments to the workshops with and without advance subsidy receipts. In principle, they agree that the companies would be in the position to make timely payments to the workshops because of the advance subsidy.

Likewise, *Table 20: Views of Workshops on Impact of NBPG Credit to Companies* below shows the views of workshops regarding the impact of NBPG credit available to biogas companies. The unanimous views expressed in the Likert scale of 1 to 5 indicate neither agreement nor disagreement to any positive benefit to the workshops by the credit facility enjoyed by the companies. The feeling is the same – the biogas companies are apathetic to workshops.

Table 20: Views of Workshops on Impact of NBPG Credit to Companies

Views	N	Mean	Std. Deviation
Will reduce loan amount	8	3.12	2.03
Will reduce price of plants	8	3.12	2.03
Will help in operations	8	3.12	2.03
Will help in increasing profit	8	3.12	2.03
Will eliminate need to take short-term loan	8	3.12	2.03
Valid N (list-wise)	8		

.4. CASH CONVERSION CYCLE OF COMPANIES

Cash Conversion Cycle (CCC) is a good tool of financial analysis to determine the financial situation of companies especially in measuring the period of financial activities through their inventory periods, receivable periods and payable periods. It can be used to interpret the contribution of advance subsidy receipts and NBPG credit to working capital requirements of the companies, and to compare how different categories of companies fare in this parameter.

Cash Conversion Cycle is the period taken for a company to conduct its financial activities within the scope of its actual stock, receivables and payables. It establishes the period for which a company can meet its operational costs considering the financial resources it has, what it expects to realize from different sources (receivables) and what payments it expects to make (payables). CCC is represented as follows:

$$\text{CCC} = \text{Inventory period} + \text{Receivable period} - \text{Payable period}$$

Any shortfall or excess to this is seen as the positive or negative gap in meeting its working capital requirement. A negative cycle indicates good financial management. The company has adequate resources for its working capital. It indicates that the company has the capability to function within its own means of resource and can even lend to others if it wants to. Alternately, a positive cycle indicates shortage of resources, and that the company needs to rely on external interest bearing loans to meet its operational costs.

The *Table 21: Collection, Inventory and Payment Periods of Companies* shows the overall average periods of receivables from customers and subsidy amounts from AEPC, the average inventory periods, and average periods for payment of pipes and fittings to hardware shops/dealers and payment of workshop appliances and other components made available by biogas companies. The average payment period to workshops is 62 days and to hardware suppliers is 31 days. Inventory period is the period for which the companies maintain stock of different materials (except construction materials which are taken care by the farmers themselves). This is 34 days, while average period for receiving subsidy from AEPC is 42 days and period of collection from farmers is 23 days.

Table 21: Collection, Inventory and Payment Periods of Companies

	N	Minimum	Maximum	Mean	Std. Deviation
Average collection period from customers (days)	33	2	60	23	16
Subsidy collection period (days)	35	10	120	42	22
Inventory period (days)	33	1	90	34	20
Average payment period of Pipe and Fitting (days)	21	2	90	31	25
Average payment period of Materials made available by company (days)	29	2	180	62	40
Valid N (list-wise)	19				

Given these different periods, the average CCC is 18 days as shown below in *Table 22: Overall Cash Conversion Cycle of Companies*. The minimum CCC of minus 103 days indicates that there are some companies that have surplus financial resources to cover their operating costs for 103 days. This is an indication of a sound financial strength and that they do not face working capital problem. It can also be interpreted as companies

having surplus to lend money if required. But the overall average of 18 days indicates that companies need to take loans to cover their operating expenses for that many days. However, with a little more effort at inventory management and timely reporting with claims for subsidy, the companies' cash management could be in a better position.

Table 22: Overall Cash Conversion Cycle of Companies

	N	Minimum	Maximum	Mean	Std. Deviation
Cash Conversion Cycle (days)	27	-103	88	18	39
Valid N (list-wise)	27				

Conceptually, advance subsidy payments provided to companies works as a substitute for the external interest bearing funds which most of them have to resort to. Thus, the higher the advance subsidy amounts available, the less the amounts needed for companies to go for loans to meet their working capital requirements. Here, if utilized properly, the advance subsidy lends an important support at a very small cost of finance. It is an incentive for companies that take their business seriously and maintain financial discipline. If this reward is not misused, companies can come out of the working capital quagmire as was intended by the biogas programme.

The CCC of the individual category of companies is presented in *Table 23: Cash Conversion Cycle of Company Categories* below. Companies receiving only advance subsidy have the lowest mean CCC at 7.6 (or 8 days) at a standard deviation of 23. This category also has companies with surplus fund for 26 days. However, the mean CCC of companies receiving both advance subsidy and NBPG credit is 35 days with maximum of 88 days. This is quite difficult to explain since this category has two sources of fund. The standard deviation is also higher. Companies receiving neither advance subsidy nor NBPG credit need to rely on loans for 46 days (the longest period). This is an understandable situation.

Table 23: Cash Conversion Cycle of Company Categories

Company Categories	N	Minimum	Maximum	Mean	Std. Deviation
Neither advance subsidy nor NBPG Credit (days)	3	27.50	66.00	45.83	19.32
Only advance subsidy (days)	5	-26.00	30.00	7.60	23.20
Both advance subsidy and NBPG Credit (days)	4	-2.50	88.00	34.88	39.85
Only NBPG Credit (days)	7	-56.50	63.00	18.93	37.80

WORKING CAPITAL REQUIREMENTS

The above CCC situation of the companies is considered to estimate the annual working capital requirements of the different categories of companies in discussion. In principle,

$$\text{Working Capital Requirement} = \text{CCC} \times \text{Daily Operating Costs}$$

The operating costs here include costs of rent, salary and cost of plants sold as shown in *Table 24: Working Capital Requirements* below. The annual cost of plants is calculated as the cost of a plant multiplied by the average number of plants planned for FY 2064/65. Since the highest number of plant construction is reportedly of 6 cu. m. size, that too, in the Hill region, for simplicity, the cost of one 6 cu. m. plant has been taken as the average

of the costs of both GI pipe-based plant and HDEP pipe-based plant in the Hill region. This works out to be Rs 7,258.¹⁹

Table 24: Working Capital Requirements

Company Categories	CCC (Mean days)	Annual average salaries and rent (Rs)	Planned average number of plants	Average cost of goods sold (Rs)	Annual cost of plants (Rs)	Total annual operating costs (Rs)	Daily operating costs (Rs)	Working capital requirements (Rs)
Neither advance subsidy nor NBPG Credit	45.83	388,000	205	7,258	1,487,890	1,875,890	5,139	235,557
Only advance subsidy	7.60	689,657	717	7,258	5,206,060	5,895,717	16,153	122,760
Both advance subsidy and NBPG Credit	34.88	1,125,556	808	7,258	5,865,371	6,990,927	19,153	667,969
Only NBPG Credit	18.93	538,231	293	7,258	2,124,919	2,663,150	7,296	138,109

Contribution of Advance Subsidy Payments

The companies receiving only advance subsidy payments have the lowest amount of working capital requirements that needs to be supplemented through some interest liable external sources of fund to construct the number of plants planned for the year. This requirement will be covered with the advance subsidy payments they will be receiving this year based on their performance last year. The average plant construction in 2063/64 (*Table 8: Trend of Plant Construction*) of this category is 468. The advance subsidy payment will work out to be over Rs. 9 lakh. Given the advance subsidy quota allocation system of BSP-Nepal, even if the category of companies is eligible for only half the amount, the working capital requirement would still be fully covered. In fact, the companies have been receiving large amounts of advance subsidy payments in the past years and these should have covered the working capital requirements very well.

Likewise, the deficit working capital of companies receiving both advance subsidy payments and NBPG credit will also be covered by the advance subsidy amount exceeding Rs. 11 lakh which they will receive for 566 plants they have constructed in the last year.

In fact, going by the figures provided by the companies, even the two remaining categories that have not received the advance subsidy payments in the past year will have their working capital requirements covered by the advance subsidy payments if they were to be eligible for that facility.

¹⁹For illustration, the costs of the GI and HDEP pipe-based plants of 6 cu. m. capacity in the Hill have been considered from the proposed price quotations of FY 2064/65 given in annex in this report. Only the total costs have been shown here.

Proposed Quotation for FY 2064/65

	4 cu. m.			6 cu. m.			8 cu. m.			10 cu. m.		
	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill
Cost of Goods Sold in Rs (Plants utilizing GI Pipe)	6,046	6,405	7,005	7,223	7,655	8,405	7,801	8,242	9,041	8,059	8,513	9,338
Cost of Goods Sold in Rs (Plants utilizing HDEP Pipe)	5,287	5,611	6,127	6,465	6,861	7,527	7,043	7,448	8,163	7,174	7,587	8,315
Average	5,667	6,008	6,566	6,844	7,258	7,966	7,422	7,845	8,602	7,617	8,050	8,827

Table 25: Correlations between Advance Subsidy Received and Planned Plants

		Plant in FY 2064/65	Advance subsidy in FY 2063/64
Plant in FY 2064-2065	Pearson Correlation	1	0.916
	Sig. (2-tailed)		0.000
	N	32	15

**Correlation is significant at the 0.01 level (2-tailed).

The correlation between planned plants for 2064/65 and advance subsidy received in 2063/64 is highly positive, i.e., 0.916 (or 91%) and, significant as shown in *Table 25: Correlation between Advance Subsidy Received and Planned Plants*. This shows that higher the advance subsidy received by companies, the higher is the number of plants planned for the subsequent year by the companies. [For detailed data, refer to *Annex 6: Correlation between Advance Subsidy Received and Planned Plants*].

Table 26: Regression Analysis of Different Variables on Annual Plant Capacity shows the significance of advance subsidy among other variables such as cash conversion cycle, advance subsidy in FY 2063/64, the stock in terms of number of plants, temporary staffs and permanent staffs on the annual plant capacity of the companies.

Table 26: Regression Analysis of Different Variables on Annual Plant Capacity

Variables	Unstandardized Coefficients (B)	Standardized Coefficients (Beta)	t	Sig.
(Constant)	204.160		4.015	0.007
Permanent staffs	-5.737	-0.303	-0.875	0.415
Temporary staffs	2.895	0.545	1.767	0.128
No. of plants in stock	-0.087	-0.034	-0.158	0.880
Advance subsidy in FY 2063/64	0.000	0.751	2.023	0.090
Cash Conversion Cycle	1.052	0.100	0.763	0.475

The regression analysis shows that advance subsidy payment has the largest positive impact (0.751 Standardized Beta Coefficient) on the annual plant capacity among other variables with the highest level of certainty, or, inversely, the lowest level of chances of error (9%). Interestingly, temporary staffs ranks as the second highest impacting variable (0.545) on annual plant capacity of the plants. The other variables tested do not have significant impact on the annual plant capacity of the plants.

Contribution of NBPG Credit

The contribution of NBPG credit alone would cover at least 25% of the working capital requirements of those companies receiving both advance subsidy payments and NBPG credit if one were to consider that the same amount of credit received in 2063/64, i.e., Rs. 167 lakh for 566 plants (*Table 9: Yearly Amount of Advance Subsidy and NBPG Credit*) will be received in 2064/65 as well. However, with about 42% planned increase in the number of plants (i.e., 808) for 2064/65, other things remaining the same, (if one may borrow the term used in the study of economics), proportionate increase in the contribution amount of credit would cover higher amount of working capital requirements of that category of companies. This is, indeed quite hypothetical because companies may decide for or against seeking the credit, or the credit may not be made available to companies receiving advance subsidy payments from AEPC.

Likewise, for companies receiving only NBPG credit, the contribution of the credit received by them in 2063/64, i.e., Rs. 64,790 for 190 plants would be sufficient to cover about 47% of their working capital requirement of Rs. 138 lakh for 2064/65 which is estimated for planned 293 plants. With an estimated 54% planned increase in the number of plants (293 plants) for 2064/65, the estimated proportionate increase in the credit would cover higher amount of the working capital requirements.

.5. CONCLUSION AND SUGGESTIONS

WORKING CAPITAL MANAGEMENT

The advance subsidy payment initiated by BSP-Nepal has indeed greatly supported the companies in their working capital management. It has contributed to substituting, if not fully, at least to reducing, the external interest bearing loan amounts that companies generally have to fall upon. The lessening of the burden of interest payments reduces the costs of the biogas companies. The companies receiving the advance subsidy payments have incorporated this important source of low cost finance in calculating their working capital requirements for the year.

Analysis has shown that companies receiving advance subsidy payments have the lowest amount of additional working capital requirements compared to those that have not received the facility. That means the additional requirement can be supplemented through lower amounts of external fund to construct the number of plants planned for the year. Very high positive correlation has been observed between advance subsidy receipts and number of plants planned for the subsequent fiscal year.

The cash conversion cycle of companies receiving advance subsidy payments is 18 days on average which is less than those not receiving the facility. Some companies receiving advance payment even have surplus fund for more than three months indicating stable working capital position without having to depend on any external source of fund. Although it may be difficult to attribute this completely to advance subsidy receipt, it is definitely one of the positive factors. It has been seen that the higher the advance subsidy amounts available, the less the amounts needed for companies to go for loans to meet their working capital requirements. With better inventory management and timely subsidy claim, the companies' cash management position could be better.

Here, if utilized properly, the advance subsidy lends an important support at a very small cost of finance. It is an incentive for companies that take their business seriously and maintain financial discipline. If this reward is not misused, companies can come out of the working capital quagmire as was intended by the biogas programme.

Institutional Features of Companies with Positive Impact Factors

Besides the direct impact on better working capital situation, a number of other factors support the strength of companies receiving advance subsidy payments. Analyses have shown that such companies are better off on different fronts of institutional capacity compared to other companies. At the same time, it can also be said that well managed companies perform better, and are the highest beneficiaries of advance subsidy facility.

Staff, Stock, Production capacity and Target: The companies have higher average number of permanent and temporary staffs compared to those not receiving the advance subsidy. Likewise, those companies also have higher capacity to maintain stocks, higher production capacity, and have set higher targets for this year. These show that such companies have bigger institutional capacity than those companies not qualified for the facility.

Planned Number of Plants: There is an increasing trend in the number of plants constructed over the last four years. Such companies have also set higher targets for the

current year. The average number of plants constructed is about three times higher than that of companies not receiving the facility.

Loans and Interest: The companies receiving advance subsidy resort to loans at higher interest rates than others. There has been an increasing trend in loan amounts and the average loan amount per company is expected to exceed Rs. 10 lakh in the current fiscal year. Growth in loan amounts in principle indicates positive functioning of the companies and the biogas sector. These companies will be expanding their business further with higher amounts of loans as the advance subsidy payment they will be receiving will not fully support their expansion plans. Alternately, it could also indicate that the advance subsidies these companies receive are diverted partly or wholly in non-business activities.

Overheads: The average annual rent and salary amounts of companies receiving advance subsidy are higher than that of companies not receiving advance subsidy. These overheads are consistent to the plant capacity size of the companies of the particular category.

Opinion on Impact of Working Capital Support: Majority of the companies agree that the advance subsidy payment has positive impacts on reducing the amounts of loans taken, facilitating daily operations, and avoiding the need to take short term loans. They agree that advance subsidy has, to some extent, a positive impact on their profitability. However, they do not agree that advance subsidy has a major role in reducing the prices of plants. This kind of response has been quite uniform across other companies too.

Likewise, companies have expressed positive impact of NBPG credit facility on the companies on the same parameters as that of advance subsidy. However, the present level of NBPG credit amount being smaller, it cannot fully support the working capital requirement of companies. They still have to rely on short term loans.

Satisfaction with Business: Overall, companies have expressed satisfaction with the biogas business they are engaged in. However, since this expression has not come very strongly, not even from the companies benefiting from advance subsidy payments, it may be considered as quite a disturbing factor for the biogas sector.

Situation of Workshops

Receivable Situation: Analysis of the receivable situation of workshops indicates that it is very poor, and indeed a major concern for the BSP. The actual average receipt period is twice as long the credit period the workshops insist they allow. However, despite the long receivable periods, the workshops are still operating, and it appears that they are quite helpless in receiving payments within reasonable time period. Interestingly, compared to the lower payment period for pipe and fittings of hardware dealers, biogas companies invariably have casual dealing with the biogas workshops when it comes to payments for appliances bought from the latter.

Opinion on Working Capital Support to Companies: The majority of the workshops do not agree that the advance subsidy payment facility to biogas companies has had or will make any positive impact on the workshops. They do not believe that companies have in anyway changed their style of payments to the workshops with and without advance subsidy receipts. In principle, they agree that if the companies would be in the position to make timely payments to the workshops because of the advance subsidy payment. But they bemoan the apathy shown by the companies and by BSP-Nepal towards the concerns of the workshops especially those workshops that do not belong to or are attached with any biogas companies.

CONDITIONS RELATED TO ADVANCE SUBSIDY PAYMENTS

Quota and Target: One of the conditions attached to the advance subsidy payment facility is that beneficiaries should increase their annual plant construction by 20% in the year for which the facility is given. Otherwise, the quota for advance subsidy payment would be reduced accordingly. In normal situations, most of the large and well-institutionalized companies manage to achieve their targets. However, given some environmental conditions beyond the control of the companies, it would be a great relief for companies if BSP-Nepal considers the prevailing political unrest in the Terai and the insecurity factors affecting the sector and not resort to cutting down the quota for not achieving 20% increase in production.

Bank Guarantee: Companies eligible for advance subsidy quota are expected to submit bank guarantee of equivalent amount. Many companies do not qualify for the facility even if they wanted to. For those companies that cannot get bank guarantees, loans have to be taken under different pretexts/reasons than for biogas enterprise itself – in the priority lending system of the banks, collateral for loans are posted under titles such as buffalo (livestock) or agro/farm equipment etc., but nothing for “biogas”. Cooperatives provide very small amounts of loans. For fixed assets located outside a municipality jurisdiction, banks may give a loan of a maximum of one lakh rupees only. Due to all these, some companies feel that it is more convenient to take up external loan than consider bank guarantee.

Although the legitimate charge for getting a bank guarantee is only 1.5%, companies end up paying more on the side (due to red tape and bribes). There is also the condition of bank guarantee not being available to those companies who cannot show fixed assets situated within the periphery of municipality or within 200 m. of main road/highway. Many companies have fixed assets in the suburban or rural areas that are not eligible for bank guarantee. BSP-Nepal should consider lobbying with some commercial banks to give recognition to such assets too on the basis of correct valuation.

ADVANCE SUBSIDY RECOVERY MODALITY

The practice of recovering the advance subsidy payment fully at the time of actual subsidy payment causes financial anxiety to companies. The deduction or reimbursement of advance subsidy payments from companies is generally done during peak season, i.e., months of Falgun/Chait when the companies need capital the most.

AEPC should not deduct full amount (as done often) right from the first ‘reporting’ of the companies. It would facilitate the companies if deductions were made phase-wise – for example, 25% deduction in the first report, 25% in the second etc., or deduction of Rs. 1000 for every plant and the balance at the end, or simply deducting the full advance subsidy amount at the end of the year. This will reduce the burden of payments which the companies need to make for salary, rent, materials and appliances etc. Since AEPC has possession of bank guarantees, a comfortable phase-wise recovery of advance subsidy payment should be worked out.

Since advance subsidy payment is made by AEPC on the recommendation of BSP-Nepal, it would be sensible for AEPC to recover the amounts at the time of subsidy payment through the recommendation of BSP-Nepal again. Companies complain that deduction at the time of actual subsidy payment is made arbitrarily without any hint to enable companies to estimate the amount that will be deducted. They are not informed how and why certain amount is deducted. Pre-informed deduction of advance subsidy or deduction

on specific criteria would enable companies to plan ahead accordingly. Some companies feel they are subject to lot of hassles in the process of advance subsidy recovery.

OTHER ISSUES

Implementation of Actual NBPG Credit Facility: Although the working capital support facility through NBPG has not been effectively implemented to cover the workshop appliances and components, the present system of giving credit for main valves through NREDC has also contributed positively by enabling companies to avail reliable and good quality component. However, BSP-Nepal must pressure NBPG to immediately initiate the disbursement of the credit through the working capital revolving fund. The modality for the credit disbursement is already designed, and NBPG must charge a service charge for this. If the credit system was started with payments of workshop bills, it would greatly mitigate their receivable problems. At the same time, it would be a big support to the companies that are unable to present bank guarantee for advance subsidy facility. After some period, with the same modality, the credit facility may be extended in the purchase of other materials. However, caution has to be taken while including hardware traders and dealers in the scheme. In the beginning, the credit could be extended to purchases of GI pipes and steel materials directly from factories of Hulas Steel and Mainawati Steel.

Call for New Biogas Companies: BSP-Nepal annually beckons new companies in the sector. One of the criteria for a new company to pre-qualify for AEPC subsidy is that the company must have experienced masons under their payroll. This has prompted employee turnover of sorts and the tendency for a mason to leave a company and start his own company, and in the process probably weakening the previous company. Thus, masons generally exhibit less loyalty to a company and may jump to another company for a bit 'extra' benefit. This is happening despite the practice of advance money being given out to masons to retain their loyalty. The issue may be in the lack of adequate number of trained masons in the sector, and NBPG and BSP-Nepal should work jointly to increase the number of trained masons. However, given the nature of the business, it is very difficult to attract genuine entrepreneurs in the trade/profession, and those that are attracted are those who are already in the trade. Not only the masons, even existing partners and or other employees split away and form new companies.

The size of the cake is the same, but the takers are increasing. This is one reason why many small companies are unable to achieve the 50 target, or they attempt to achieve it in some illegitimate way through falsification of documents, malpractices to the extent of 'hijacking' plants constructed or started by other companies, drastic undercutting of prices etc. And both RBCCs and BSP-Nepal are considered to be ineffective to handle such situations. The situation has created unhealthy competition. Black-listed companies and/or defaulters gain legitimacy if they are allowed to be registered as new companies. Besides, the increase in the number of companies in the field has not guaranteed the increase in total number of plants over last few years, something BSP-Nepal would like to happen.

Better Financial Management: There is no doubt that most biogas companies face shortage of working capital to various degrees. Much of the problem is due to management deficiency of the companies themselves and the situation can be improved only by developing proper costing and financial management capacity and discipline of the companies. This can be done through training and motivation under the joint efforts of the companies, RBCCs, NBPG and BSP-Nepal.

Faster Subsidy Reimbursement: On the technical front, companies face working capital problem due to time-consuming procedure of reimbursement of subsidy involving the companies, BSP-Nepal and AEPC. A number of times, in the first place, it is the companies themselves to be blamed for not fulfilling all documentary requirements for subsidy claim. Some time is consumed in getting the documents right. BSP-Nepal verifies the documents and then recommends for subsidy release to AEPC. This is normally done in batches of forms for 500 plants each every month. BSP-Nepal could improve claim processing and, rather than forwarding subsidy claim forms to AEPC once a month, BSP-Nepal should consider sending them twice a month or more frequently irrespective of the number of forms received and number of plants of a company. The faster the subsidy released, the better it is for the working capital situation of the companies.

Annual Agreement: The annual agreement between BSP-Nepal and the biogas companies is subject to completion of plant verifications, company evaluation and grading, and incorporation of various documentary and technical requirements etc. Companies are not eligible for subsidy without the agreement and they generally fail to plan ahead on the financial and technical fronts without it. It would reduce administrative hassles if one were to consider automatic agreement renewal system for existing companies rather than subject them to annual agreement system. The abrogation clauses in BSP-Nepal agreement should provide adequate ground to ensure that companies comply with the norms of the programme. Timely renewal of agreement allows companies to start planning for the year even if actual field work cannot start during off-season.

Attention to Plight of Workshops Related to Non-renewal of Agreement: Workshops should be informed about impending non-continuation of agreement by BSP-Nepal with biogas companies, because a company leaving the sector means loss of receivables of workshops. Disqualification of companies has made workshops suffer great losses in the past. As it is, workshops suffer from huge receivables from operating companies, and it becomes even more difficult for them to recover their receivables from companies that have left the sector. Workshops feel that BSP-Nepal does not understand their plight, and it does not find it necessary to inform them.²⁰

Working Capital Support to Workshops: One of the expectations of the working capital intervention to biogas companies is to enable them to handle their payables smoothly. The biggest consideration, no doubt was the concern to mitigate the huge receivables problem of the workshops. As observed, companies have shown scant concern toward this. If BSP-Nepal could consider drawing up a modality to make direct payments to factories like Hulas Steel and Mainawati Steel from where most workshops purchase GI pipes and steel raw materials, it could be a big support to the workshops. Of course, this demands a tight recovery mechanism.

Alternately, since companies receiving working capital support are not maintaining financial discipline by making timely payments on purchases of various materials and appliances, especially to workshops, rather than providing advance subsidy payments to companies, BSP-Nepal could consider making direct payment to workshops as per the bills of purchase by the companies. The beneficiaries of this facility are the same companies that qualify for advance subsidy payments. Since most workshops are suffering at the expense of biogas companies, this could be a direct way of assisting the workshops.

²⁰ Workshops are not confident that the BSP-Nepal letter to biogas companies to clear their dues with workshops as a condition for renewal of their agreement for the present fiscal year will actually be implemented. Although, it is a welcome concern shown for the plight of workshops, they feel that BSP-Nepal is weak in implementation probably due to some pressures.

FINAL CONCLUSION

Overall, the working capital support of BSP has made a good impact on the companies and also to the biogas sector. The advance subsidy payment should be continued with some changes in payment modality. If payments could be made more directly to the actual end creditors of the companies like workshops and hardware dealers, the support would have been more effective.

The little credit presently provided by NBPG in the sale of main gas valve and other materials has positive implication. The NBPG working capital credit should be initiated immediately with wider scope of support.

A few companies may have diverted funds received in one large chunk to non-business activities like purchase of land or vehicle or used in non-productive matters.²¹ However, if less than 10% of the companies are misusing the advance subsidy payments, then this should not be taken too seriously. BSP-Nepal should not indulge in monitoring and policing activities that it cannot handle. It is more important to look forward to promote the concept and encourage companies to make proper use of the facility.

Workshops should be given serious attention because, in the long run, the workshops may be in a better position than the biogas companies alone to serve the interest of the BSP and strengthen the biogas sector. In the future, if BSP or the subsidy attached to the program discontinues, the biogas workshops can use the trained masons to construct plants directly by using workshop appliances at lower prices. So even if biogas companies fail to support the sector given the situation, at least the workshops can be counted upon to be in trade by going into plant construction. At present, biogas companies are benefiting by charging higher prices for workshop appliances to the farmers. There is no rational for biogas companies to quote higher prices in the quotation when they hardly take any risks in terms of product guarantee and do not make timely payments etc.

Let biogas companies be delegated to operate in specified areas/regions only according to their grades. This will discourage small companies from operating wherever they like, and, to some extent, control unhealthy competition with larger and established companies. It will also put pressure on companies to achieve the minimum 50 plants or their other targeted numbers. The grading should be the means of evaluating companies and assigning respective areas/regions for operation.²²

Once the NBPG credit facility is initiated for the benefit of the companies not qualified to receive advance subsidy payment, the inability of acquiring bank guarantee may not be an issue to get working capital support. However, even if a company cannot acquire bank guarantee, and it seeks the advance subsidy payment facility, BSP-Nepal may consider them selectively on the basis of retention of Rs. 700 (i.e., Rs. 600 for after sales service and Rs. 100 for training) per plant. This amount can be considered amount as a guarantee. Likewise, BSP-Nepal may also consider the annual inflation of prices in the NBPG quotation as a justification to disburse advance subsidy payment without bank guarantee.

²¹ Although the few companies that have used the advance subsidy payments in capital expenses like land or vehicles try to rationalize their actions in building up tangible assets which could be used as collateral to get loans or for increased efficiency in travels and transportation related to business, such actions cannot be condoned. The advance subsidy payments are meant for working capital and not for capital expenses.

²² The modality could be developed in line with the concept of grading of commercial banks by Nepal Rastra Bank.

ANNEXES

Annex 1: List of Persons Interacted with

Mr. Saroj Rai	Executive Director, Biogas Support Programme-Nepal
Mr. Balaram Shrestha	Director, Biogas Support Programme-Nepal
Mr. Mohamed Siddiki	Biogas Support Programme-Nepal
Mr. Prakash Lamichhane	Biogas Support Programme-Nepal
Mr. Keshav Dawadi	Program Officer, Nepal Biogas Producers Group
Mr. Bhattarai	Nepal Biogas Producers Group
Dr. Surya Prakash Hada	General Manager, Gobargas Tatha Krishi Yantra Bikash, Kathmandu
Mr. Tara Nath Lamsal	Chairman, RBCC, Kathmandu and Manager, Gobargas Tatha Krishi Yantra Bikash, Kathmandu
Mr. Krishna Devkota	Executive Chairman, Motherland Energy Group, Kathmandu
Mr. Ram Chandra Gautam	Managing Director, Rastriya Gobargas Nirman Tatha Sewa, Bharatpur
Mr. Keshav Devkota	Director, Rastriya Gobargas Nirman Tatha Sewa, Bharatpur
Mr. Prakash Shrestha	Director, National Biogas Construction and Services, Bharatpur
Mr. Damodar Subedi	Chairman, RBCC, Bharatpur and General Manager, Janta Urja Bikash Company, Bharatpur
Mr. Guru Dutta Timilsina	Chairman, Nil Kamal Gobargas Company, Bharatpur
Mr. Krishna Subedi	Office Secretary, RBCC, Bharatpur
Mr. Khil Bahadur Bisural	Manager, Gobargas Tatha Krishi Yantra Bikash, Bharatpur Branch
Mr. Hari Bahadur Adhikari	General Manager, Baikalpik Urja Bikash Company, Bharatpur
Mr. Shesh Raman Khanal	Managing Director, National Iron and Alternative Power Development Company, Bharatpur
Mr. Dhruva Prasad Khanal	Biogas Tatha Urja Bikash Company, Bharatpur
Mr. Dinesh Sharma	Khanekhola Hardware, Bharatpur
Mr. Achyut Adhikari	Marsyangdi Biogas Company, Gaidakot, Nawalparasi
Mr. Min Prasad Bhandari	Triveni Gobargas Company, Kawasoti, Nawalparasi
Mr. Upendra Rimal	Rapti Gobargas Company, Hetauda, Makawanpur
Mr. Bikash Dahal	Shikhar Biogas Products and Industries, Butwal
Mr. Dom Bahadur Gurung	Chairman, RBCC, Butwal and General Manager, Gharelu Gobargas Tatha Prabidhi Bikash Company, Butwal
Mr. Him Lal Neupane	Gharelu Gobar Gas Tatha Prabidhi Bikash Company, Butwal
Mr. Ram Bahadur Gurung	Managing Director, Pokharel Biogas Products Industries, Butwal
Mr. Kishore Gyawali	Managing Director, Public Biogas Tatha Urja Bikash Company, Butwal
Mr. Bhuwan Acharya	Public Biogas Tatha Urja Bikash Company, Butwal
Mr. Narayan Gyawali	New Deep Public Gobargas, Dang (met in Butwal)
Mr. Laxman Aryal	Director, Rastriya Gobargas Nirman Tatha Sewa, Butwal Branch
Mr. Narayan Neupane	Paschimanchal Dhaulagiri Gobargas, Butwal
Mr. Rajendra Chaudhari	Paschimanchal Dhaulagiri Gobargas, Butwal
Mr. Kehar Singh Thapa	General Manager, Butwal Gobargas Company, Butwal
Mr. Dhruva Subedi	Lekhbeshi Saurya Urja Tatha Gobargas Sewa Company, Butwal
Mr. Narayan Nepal	Lekhbeshi Saurya Urja Tatha Gobargas Sewa Company, Butwal
Mr. Narayan Bhattarai	Narayan Metal Cast, Butwal
Mr. Indra Bahadur Khatri	Manager, Asian Gobargas Products, Butwal
Mr. Dhan Bahadur Thapa	Shital Gobargas Company, Butwal
Mr. Ganesh KC	Manager, Bhudeo Trading, Butwal
Mr. Nawa Raj Kunwar	RBCC Chairman, Pokhara and Director, Rastriya Gobargas Nirman Tatha Sewa, Pokhara Branch
Mr. Ramesh Ghimire	Manager, Pragati Gobargas Sewa Kendra, Pokhara Branch
Mr. Lekh Nath Tiwari	General Manager, Bageswori Gobargas Company, Pokhara
Mr. Bishnu Prasad Sharma	Director, Manakamana Gobargas Sewa Kendra, Pokhara
Mr. Som Nath Bastola	Managing Director, Deepshikha Urja Bikash Company, Talchowk, Kaski
Mr. Harihar Bhattarai	General Manager, Danphe Biogas Company, Birtamod, Jhapa
Mr. Indramani Subedi	Director, Kamdhenu Baikalpik Urja Company, Surunga, Jhapa
Mr. Netra Prasad Neupane	Chairman, Sana Krishak Samudaik Gobargas Company, Morang

Mr. Shyam Ghimire	Managing Director, Shiva Shakti Gobargas Company, Birtamod, Jhapa
Mr. Chij Lal Chaudhari	Kamala Gobargas Company, Birtamod, Jhapa
Mr. Yam Nath Dahal	Director, Lokpriya Gobargas Tatha Saurya Shakti Bikash, Itahari
Mr. Mahendra Acharya	Mechi Gobargas Company, Morang
Mr. Yuba Raj Poudel	General Manager, Munal Gobargas Company, Morang
Mr. Yuba Raj Dahal	Executive Chairman, Suryodaya Gobargas Company, Morang
Mr. Shyam Subedi	Manager, Shiva Engineering Works, Biratnagar
Mr. Upendra Sapkota	All Nepal Biogas Company, Banepa, Kavre
Mr. Padam Dulal	Deurali Gobargas Company, Banepa, Kavre
Mr. Guna Bahadur Lama	Chairman, Nepal Urja Engineering, Banepa, Kavre

Annex 2: Biogas Survey Sheet (for Companies)

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2_ तपाईंको कम्पनीमा ग्राहकबाट अर्डर नआए पनि सामान्यतया कतिवटा प्लान्ट बनाउन पुग्ने सामग्रीहरू गोदाममा राख्ने गर्नु हुन्छ?

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5_ तलका आर्थिकवर्षहरूमा तपाईंको कम्पनीले कतिवटा प्लान्टहरू बनायो?

आर्थिक वर्षमा	निर्माण भएका प्लान्ट संख्या
२०६४-२०६५ (अनुमानित बनाउने योजना)	
२०६३-२०६४	
२०६२-२०६३	
२०६१-२०६२	
२०६०-२०६१	

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9_ तपाईंले बैकल्पिक उर्जा प्रवर्धन केन्द्रबाट कति रुपियाँ अग्रिम अनुदान लिनु भयो ? (यदि नलिनुभएको भए खाली छोडिदिनुहोला)

आर्थिक वर्षको	अग्रिम अनुदान रकम रु.
२०६३-२०६४ कोलागि	
२०६२-२०६३ कोलागि	

10_ तपाईंले नेपाल बायोग्यास प्रवर्धन समुह (ने. बा. प्र. स.) बाट कति रकम बराबरको क्रेडिट पाउनु भयो ? (यदि नलिनुभएको भए खाली छोडिदिनुहोला)

आर्थिक वर्षको	ने. बा. प्र. स. को क्रेडिट रकम रु.
२०६३-२०६४ कोलागि	
२०६२-२०६३ कोलागि	

11_ तपाईंलाई बैकल्पिक उर्जा प्रवर्धन केन्द्रबाट प्राप्त अग्रिम अनुदानको रकमले प्रत्यक्ष रुपमा के कस्तो फाइदा पुगेको छ ? (कृपया तीन चार बुँदाहरु छोटकरीमा लेखिदिनुहोला)

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अग्रिम अनुदान पाएको कारणले बायोग्यास कंपनीलाई तलका फाइदाहरु हुन्छन् भन्ने कुरामा कतिको सहमत हुनुहुन्छ ? (x/]s k|Zgsf] nflu ;a)eGbf pko"tm hjfkmsf] vfln sf]&fdf X lrGx nufpg" xf]nf)

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१२)	ऋण लिने रकममा कमी हुन्छ					
१३)	प्लान्टको बिक्री मूल्य कम हुन्छ					
१४)	कार्य संचालनमा सहयोग हुन्छ					
१५)	नाफा बृद्धिमा सहयोग हुन्छ					
१६)	अल्पकालीन ऋण लिनु नपर्ने हुन्छ					

ने. बा. प्र. स. बाट क्रेडिट पाएको कारणले बायोग्यास कंपनीलाई तलका फाइदाहरु हुन्छन् भन्ने कुरामा कतिको सहमत हुनुहुन्छ ? (x/]s k|Zgsf] nflu ;a)eGbf pko"tm hjfkmsf] vfln sf]&fdf X lrGx nufpg" xf]nf)

प्र. नं	फाइदाहरु	एकदमै	सामान्यतया	न असहमत छु,	सामान्यतया	एकदमै
		असहमत छु	असहमत छु	न सहमत छु	सहमत छु	सहमत छु
१७)	ऋण लिने रकममा कमी हुन्छ					
१८)	प्लान्टको बिक्री मूल्य कम हुन्छ					

१९)	कार्य संचालनमा सहयोग हुन्छ				
२०)	नाफा बृद्धिमा सहयोग हुन्छ				
२१)	अल्पकालीन ऋण लिनु नपर्ने हुन्छ				

22_ सामान्यतया ऋण लिनुभएको कति दिनमा तिर्नुहुन्छ ?

===== दिनमा

23_ तपाईंले लिएको ऋणमा बार्षिक कति प्रतिशत व्याजदर तिर्नु हुन्छ ?

===== प्रतिशत

24_ तपाईंले वार्षिक रूपमा छोटो अबधिको कार्यसंचालन पुँजीकोलागि ऋण कति लिनुभयो ?

आर्थिक वर्षमा	ऋण लिनु भएको रकम रु.
२०६४-२०६५ (अनुमानित)	
२०६३-२०६४	
२०६२-२०६३	
२०६१-२०६२	
२०६०-२०६१	

25_ #/ ef*fjfkf tkfO{sf] sDkgLsf] ;/b/ aflif{s vr{ slt x"G% <

?=====

26_ :yfO sd{rf/Lsf] tnaifkfk tkfO{sf] sDkgLsf] ;/b/ aflif{s vr{ slt x"G% <

?=====

27_ निम्न सामग्रीहरू किनेको सामान्यतया कति दिनमा पैसा भुक्तानी गर्नु हुन्छ ?

qm =;=	zLif{s	pwf/f] lng] cjlw - lbgdf_	qm= ;=	zLif{s	pwf/f] lng] cjlw - lbgdf_
!	kfOk / Ikml6E M		@	sDkgLjf6 pknAw u/fpg] pks/0fx? M	
!	Prl8lk kfOk		!	:6f]e PEñ	
@	lh=cfO{+ kfOk !÷@/E		@	ldS:r/	
#	;s]6 !÷@/E		#	PdN;g k]G6	
\$	lh=cfO{ PNaf] !÷@/E		\$	Ogn]6 kfOk	
%	IgKkn !÷@ x ^/E		%	8f]d UofF; kfOk	
^	6]k\mn]g 6]k		^	d]g UofF; eNe	
&	a]f; o'lgog		&	jf6/ 8<]g	
			*	UofF; 6\ofk	
			(gfOngxf]h kfOk	
			!)	NofDk	
			!!	k];/ u]h	

28_ tkfO{+ uf]j/ Uof+; Joj;foaf^ slQsf] ;Gt"i^ x"g"x"G% <

1_ Ps/lQ klg ;Gt"i^ %}g
2_ w]/) dfqfdf ;Gt"i^ %}g
3_ cfwfpwL ;Gt"i^ %"
4_ w]/) dfqfdf ;Gt"i^ %"
5_ k"/) ;Gt"i^ %"

29_ तपाइँलाइ भन्न मन लागेको कुरा केही भए छोटकरीमा तल लेखिदिनुहोला ।

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(धन्यवाद)

Annex 3: Biogas Survey Sheet (for Workshops)

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sDkgLsf]
gfd=====
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&fp ===== lhNnf=====
cGrn =====

kmf]g gDa/ =====

tkfO{s]f k"/f gfd ===== kb
=====

;xL ===== ldlt =====

```

!+= sDkgLjf6 pknAw u/fpg] pks/0fx?

	pks/0fx?		s o d'No k lt OsfO{ ?=	
1	:6f]e PËn	;]6		
2	ldS:r/	;]6		
3	Ogn]6 kfOk	lk;		
4	8f]d UofF; kfOk	ld6 /		
5	jf6/ 8«]g	lk;		
6	UofF; 6\ofk	lk;		

12_ Jfflif{s ?kdf tkfO{+sf] sDkgLsf] ;/b/df slt j^f uf]j/ Uofm+; KnfG^
a/fa/sf] ;fdfg agfpg] Ifdtf % ?
===== j^f

4_ तपाईको वर्कसपबाट सामग्री किन्नेलाइ कति महिनाकोलागि उधारो दिनुहुन्छ ?

..... महिना/दिन

5_ बायोग्यास कम्पनीहरुले कति दिनमा सामानको पैसा दिन्छन् ?

..... दिन

6_ एकचोटी सामान खरीद गर्दा कम्पनीहरुले कति रुपैयाको गर्ने गर्दछन् ?

रु देखि सम्म

7_ तपाईका सामग्रीहरुमा कति समयको ग्यारेन्टी दिनु हुन्छ ?

..... दिन

8_ jfof]Uof; sDkgLn] बैकल्पिक उर्जा प्रबर्धन केन्द्रबाट प्राप्त अग्रिम अनुदानको रकमले तपाइलाइ प्रत्यक्ष रुपमा के कस्तो फाइदा पुगेको छ ? (कृपया तीन चार बुँदाहरु छोटकरीमा लेखिदिनुहोला)

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9_ jfof]Uof; sDkgLn] ने. बा. प्र. स. बाट क्रेडिट पाएको कारणले तपाइलाइ प्रत्यक्ष रुपमा के कस्तो फाइदा पुगेको छ ? (कृपया तीन चार बुँदाहरु छोटकरीमा लेखिदिनुहोला)

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jfof]Uof; sDkgLn] बैकल्पिक उर्जा प्रबर्धन केन्द्रबाट अग्रिम अनुदान पाएको कारणले तपाइलाइ तलका फाइदाहरु हुन्छन् भन्ने कुरामा कतिको सहमत हुनुहुन्छ ? (x/]s k|Zgsf] nflu ;a)eGbf pko"tm hjfkmsf] vfln sf]&fdf X lrGx nufpg" xf]nf)

प्र. नं	फाइदाहरु	एकदमै असहमत छु	सामान्यतया असहमत छु	न असहमत छु, न सहमत छु	सामान्यतया सहमत छु	एकदमै सहमत छु
10)	ऋण लिने रकममा कमी हुन्छ					
11)	pks/Ofx?sf] बिक्री मूल्य कम हुन्छ					
12)	कार्य संचालनमा सहयोग हुन्छ					
13)	नाफा बृद्धिमा सहयोग हुन्छ					
14)	अल्पकालीन ऋण लिनु नपर्ने हुन्छ					

jfof]Uof; sDkgLn] ने. बा. प्र. स. बाट क्रेडिट पाएको कारणले तपाइलाइ तलका फाइदाहरु हुन्छन् भन्ने कुरामा कतिको सहमत हुनुहुन्छ ? (x/]s k|Zgsf] nflu ;a)eGbf pko"tm hjfkmsf] vfln sf]&fdf X lrGx nufpg" xf]nf)

प्र. नं	फाइदाहरु	एकदमै असहमत छु	सामान्यतया असहमत छु	न असहमत छु, न सहमत छु	सामान्यतया सहमत छु	एकदमै सहमत छु
15)	ऋण लिने रकममा कमी हुन्छ					
16)	pks/Ofx?sf] बिक्री मूल्य कम हुन्छ					
17)	कार्य संचालनमा सहयोग हुन्छ					
18)	नाफा बृद्धिमा सहयोग हुन्छ					
19)	अल्पकालीन ऋण लिनु नपर्ने हुन्छ					

20_ तपाइँलाइ भन्न मन लागेको कुरा केही भए छोटकरीमा तल लेखिदिनुहोला ।

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(धन्यवाद)

Annex 4: Proposed BSP Quotation for FY 2064/65 (with GI Pipe)

Heading	Unit	Quantity			Average Market Price			4 cu. m.			6 cu. m.			8 cu. m.			10 cu. m.			
		4 cu. m.	6 cu. m.	8 cu. m.	10 cu. m.	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill
Construction materials																				
Bricks/Stones	piece	1200	1400	1700	2000	5.16	5.23	5.75	6,191	6,270	6,897	7,223	7,315	8,047	8,770	8,883	9,771	10,318	10,450	11,495
Sand	Bora	60	70	80	90	26	43	47	1,557	2,574	2,831	1,816	3,003	3,303	2,076	3,432	3,775	2,335	3,861	4,247
Gravel	Bora	30	35	40	50	34	65	71	1,010	1,947	2,142	1,179	2,272	2,499	1,347	2,596	2,856	1,684	3,245	3,570
Steel rod for slab	Kg	15	15	16	16	60	63	69	906	939	1,033	906	939	1,033	966	1,002	1,102	966	1,002	1,102
Cement (Terai)	Bora	11	13	16	19	493			5,424		-	6,410	-	-	7,889	-	-	9,369	-	-
Cement (Hill)	Bora	12	14	18	21		501	551		6,011	6,612		7,013	7,714		9,017	9,918		10,519	11,571
Labour	Days	15	20	23	25	150	150	165	2,250	2,250	2,475	3,000	3,000	3,300	3,450	3,450	3,795	3,750	3,750	4,125
Total																				
Pipe and Fitting																				
GI Pipe	meter	12	12	12	12	126	131	144	1,507	1,577	1,734	1,507	1,577	1,734	1,507	1,577	1,734	1,507	1,577	1,734
GI Socket 1/2"	meter	2	2	2	2	20	25	27	40	49	54	40	49	54	40	49	54	40	49	54
GI Elbow 1/2"	piece	5	5	5	5	22	24	27	109	123	135	109	123	135	109	123	135	109	123	135
GI Nipple 1/2"x6"	piece	2	2	2	2	34	39	43	68	77	85	68	77	85	68	77	85	68	77	85
GI Tee 1/2"	piece	1	2	2	2	36	40	44	36	40	44	71	80	88	71	80	88	71	80	88
Teflon Tape	piece	3	3	3	3	10	14	16	30	43	48	30	43	48	30	43	48	30	43	48
Total																				
Appliances provided by Companies																				
Stove angle	set	1	1	2	2	478	487	536	478	487	536	478	487	536	478	487	536	478	487	536
Mixture	set		1	1	1	697	710	781	-	-	-	697	710	781	697	710	781	697	710	781
Emulsion paint	litre	1	1	1	2	157	160	176	157	160	176	157	160	176	157	160	176	157	160	176
Inlet pipe	meter	4	4	4	4	79	80	88	315	321	353	315	321	353	315	321	353	315	321	353
Dome gas pipe	piece	1	1	1	1	457	466	512	457	466	512	457	466	512	457	466	512	457	466	512
main gas valve	piece	1	1	1	1	294	299	329	294	299	329	294	299	329	294	299	329	294	299	329
Water drain	piece	1	1	1	1	129	132	145	129	132	145	129	132	145	129	132	145	129	132	145
Gas tap	piece	1	2	2	2	206	210	230	206	210	230	411	419	461	411	419	461	411	419	461
Nylon pipe	meter	1	3	3	3	20	20	22	20	20	22	59	60	67	59	60	67	59	60	67
Total																				
Construction cost/Supervision																				
After sales services																				
Promotion and Training																				
Company service cost/Administrative cost																				
Total																				
Grand Total of plant																				
5,973																				
Total																				
Grand Total of plant																				

Optional:

Pressure gauge Rs. 280

Biogas lamp Rs. 514

Annex 5: Proposed BSP Quotation for FY 2064/65 (with HDEP Pipe)

Heading	Unit	Quantity			Average Market Price			4 cu. m.			6 cu. m.			8 cu. m.			10 cu. m.			
		4 cu. m.	6 cu. m.	8 cu. m.	10 cu. m.	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill	Terai	Hill	R. Hill
Construction materials																				
Bricks/Stones	piece	1200	1400	1700	2000	5.16	5.22	5.75	6.191	6.270	6.897	7.223	7.315	8.047	8.770	8.883	9.771	10.318	10.450	11,495
Sand	Bora	60	70	80	90	26	43	47	1,557	2,574	2,831	1,816	3,003	3,303	2,076	3,432	3,775	2,335	3,861	4,247
Gravel	Bora	30	35	40	50	34	65	71	1,010	1,947	2,142	1,179	2,272	2,499	1,347	2,596	2,856	1,684	3,245	3,570
Steel rod for slab	Kg	15	15	16	16	60	63	69	906	939	1,033	906	939	1,033	966	1,002	1,102	966	1,002	1,102
Cement (Terai)	Bora	11	13	16	19	493			5,424		-	6,410		-	7,889		-	9,369		-
Cement (Hill)	Bora	12	14	18	21		501	551		6,011	6,612		7,013	7,714		9,017	9,918		10,519	11,571
Labour																				
Labour man-days	Days	15	20	23	25	150	150	150	2,250	2,250	2,250	3,000	3,000	3,000	3,450	3,450	3,450	3,750	3,750	3,750
Total									17,338	19,991	21,765	20,534	23,541	25,596	24,499	28,379	30,872	28,422	32,827	35,735
Pipe and Fitting																				
HDEP Pipe	meter	12	12	12	12	31	32	35	372	388	422	372	388	422	372	388	422	372	388	422
GI Pipe 1/2"	meter	3	3	3	2	126	131	145	377	394	434	377	394	434	377	394	434	251	263	289
GI Socket 1/2"	piece	2	2	2	2	20	25	27	40	49	54	40	49	54	40	49	54	40	49	54
GI Elbow 1/2"	piece	5	5	5	5	22	25	27	109	123	135	109	123	135	109	123	135	109	123	135
GI Nipple 1/2"x6"	piece	2	2	2	2	34	39	43	68	77	85	68	77	85	68	77	85	68	77	85
GI Tee 1/2"	piece	1	2	2	2	36	40	44	36	40	44	71	80	88	71	80	88	71	80	88
Teflon tape	piece	3	3	3	3	10	14	16	30	43	48	30	43	48	30	43	48	30	43	48
Total									1,032	1,115	1,222	1,067	1,155	1,266	1,067	1,155	1,266	942	1,024	1,122
Appliances provided by Companies																				
Stove angle	set	1	1	1	2	478	487	536	478	487	536	478	487	536	478	487	536	956	975	1,072
Mixture	set					697	710	781	-	-	-	697	710	781	697	710	781	697	710	781
Emulsion paint	litre	1	1	1	2	157	160	176	157	160	176	157	160	176	157	160	176	315	321	353
Inlet pipe	meter	4	4	4	4	79	80	88	315	321	353	315	321	353	315	321	353	315	321	353
Dome gas pipe	piece	1	1	1	1	457	466	512	457	466	512	457	466	512	457	466	512	457	466	512
main gas valve	piece	1	1	1	1	294	299	329	294	299	329	294	299	329	294	299	329	294	299	329
Water drain	piece	1	1	1	1	129	132	145	129	132	145	129	132	145	129	132	145	129	132	145
Gas tap	piece	1	2	2	2	206	210	230	206	210	230	411	419	461	411	419	461	411	419	461
Nylon pipe	meter	1	3	3	3	20	20	22	20	20	22	59	60	67	59	60	67	59	60	67
Total									2,056	2,095	2,305	2,997	3,056	3,361	3,475	3,543	3,897	3,633	3,703	4,074
Construction cost/Supervision																				
After sales services																				
Promotion and Training																				
Company service cost/Administrative cost																				
Total									5,594	5,955	6,413	6,382	6,830	7,414	6,771	7,224	7,832	6,937	7,404	8,028
Grand Total of plant									26,019	29,157	31,706	30,981	34,583	37,636	35,813	40,301	43,866	39,934	44,958	48,957

Optional:

Pressure gauge Rs. 280
Biogas lamp Rs. 514

Annex 6: Correlation between Advance Subsidy Received and Planned Plants

Name of Companies	Advance Subsidy (2063/64) in Rs.	Planned Production (2064/65)
Bageswori Gobargas Co.	368,000	320
Baikalpik Urja Bikash Co.	170,000	300
Deep Shikha Urja Bikash Co.	198,000	250
Hetauda Gobargas Co.	60,000	251
Janta Urja Bikash Co.	512,000	300
Nil Kamal Gobargas Co.	678,000	600
Rastriya Gobargas Nirman Tatha Sewa	4,490,000	3000
Biogas Tatha Urja Bikash Co.	1,900,000	1200
Gharelu Gobargas	100,000	1100
Manakamana Gobargas Sewa Kendra	136,000	250
Mechi Gobargas Co.	1,062,000	650
Pragati Gobargas Sewa Kendra	1,496,000	1300
Rapti Gobargas Co.	136,200	865
Sana Krishak Samudaik Gobargas Co.	896,000	700
Tribeni Gobargas Co.	500,000	400
United Biogas Co.	6,500	NA
Correlation	0.916	

Source: Field survey