

BIOMASS ENERGY AND CO-GENERATION (NON-BAGASSE) IN INDUSTRY

The industrial sector today consumes approximately 35% of total electricity generated in the country. At the same time, high quality stable power is required to attain the higher growth rate projected for this sector. Majority of industries in India require both electrical and thermal energy. Today, they either buy power from the State Electricity Boards, or generate their own power largely through diesel generators and meet their thermal energy requirements through captive means mostly utilizing fossil fuels such as coal, oil or natural gas. As fossil fuels are limited, and have adverse environmental impact, it would be appropriate to use non-conventional energy sources including biomass resources such as crop residues and agro-industrial wastes for generation of energy in the industries mainly through biomass gasification technology for meeting their total / partial requirements for both electrical and thermal energy.

There are several industries such as sugar, paper and pulp, textiles, fertilizers, petroleum, petrochemicals and food processing, etc. which require electrical as well as thermal energy for their operations. These requirements can either be met through different energy sources, or from a single source, which is capable of generating electricity as well as producing thermal energy. Simultaneous production of power and thermal energy from a single fuel source is termed as co-generation. The power generated from such co-generation plants can be used for meeting the captive requirements and the surplus power produced can be exported to the grid.

Industrial co-generation has in the past not received adequate attention, as cheap power and fuel were abundantly available. However, with increasing tariffs, and unreliable supply of grid power, there is considerable opportunity for the industrial sector to tap the potential for producing electricity and thermal energy in the co-generation mode. In particular, there is significant potential in breweries, caustic soda plants, textile mills, distilleries, fertilizer plants, paper and pulp industry, solvent extraction units, rice mills, petrochemical plants, etc. Furthermore, co-generation projects based on conventional fuels such as coal, oil, lignite, gas and un/semi-utilized wastes / rejects like dolochar, coal rejects and refinery mud, etc. can also be installed in industry for meeting their power and energy requirements.

The Ministry has notified a Scheme [on Biomass Energy and Co-Generation \(non-bagasse\) in Industry](#) with the following objectives:

1. To encourage the deployment of biomass energy systems in industry for meeting thermal and electrical energy requirements.
2. To promote decentralized / distributed power generation through supply of surplus power to the grid.
3. To conserve the use of fossil fuels for captive requirements in industry.
4. To bring about reduction in greenhouse gas emissions in industry
5. To create awareness about the potential and benefits of alternative modes of energy generation in industry.

The scheme has a provision for providing Central Financial Assistance for encouraging setting up Biomass Gasifiers and Biomass Co-generation (non-bagasse) projects in the industries for meeting their thermal and electricity requirements.



250 kW Thermal gasifier system at M/s Arasan Aluminium Industries Pvt. Ltd., Sivakasi, Tamilnadu

An indicative list of [Gasifiers Manufacturers in India](#) has been compiled for reference of various stakeholders working in this area.



100 kW gasifier System at M/s Maheshwari Rice Mills, Lakhimpur Khiri, U.P.

F.No. 2/2/2005 -UICA
Government of India
Ministry of New and Renewable Energy
(Urban, Industrial & Commercial Applications Group)
Block No. 14, CGO Complex
Lodi Road, New Delhi – 110 003
Date : 25th July, 2005

To

- Chief Secretaries of State Governments
- Administrators of Union Territories
- Heads of State Nodal Agencies
- Heads of IREDA / Banks / FIs

Subject : Programme on Biomass Energy and Co-generation (non-bagasse)
in Industry for implementation in 2005-06.

Sir,

I am directed to convey the sanction of the Government of India for the

implementation of the Programme on "Biomass Energy and Co-generation (non-bagasse) in Industry" during 2005-06. The scheme provides for Central Financial Assistance for setting up of biomass co-generation (non-bagasse) and biomass gasifier projects for generation of thermal and electrical energy in industries and incentives to State Nodal Agencies and Financial Institutions. The scheme also provides for Grants-in-Aid to State Nodal Agencies, NGOs and other concerned institutions for promotional activities i.e. for organizing seminars, workshops, training / orientation programmes, technology validation, strategic studies, industry-wise sectoral studies and performance monitoring & evaluation, etc. and promotional incentives for co-generation projects based on conventional fuels and rejects.

2. Objectives

The main objectives of the programme on Biomass Energy and Co-Generation (non-bagasse) in Industry are given below :-

- i) To encourage the deployment of biomass energy systems in industry for meeting thermal and electrical energy requirements.
- ii) To promote decentralized / distributed power generation through supply of surplus power to the grid.
- iii) To conserve the use of fossil fuels for captive requirements in industry.
- iv) To bring about reduction in greenhouse gas emissions in industry.
- v) To create awareness about the potential and benefits of alternative modes of energy generation in industry.

3. Scope

The Programme will cover the following types of projects and other activities:

i) Biomass gasifiers for thermal and electrical applications in industry

The deployment of small scale gasifiers has already been demonstrated for electrical and thermal energy applications. Greater thrust is proposed to be provided for the deployment of gasifiers of higher capacity, to operate on diversity of biomass feed material, and for specific segments of industrial applications for captive power generation and production of thermal energy or co-generation of heat and power. Deployment of 100% producer gas engines will be encouraged for achieving higher efficiency and eliminating use of fossil fuels.

ii) Biomass Co-generation Projects

To meet the requirement of captive power and thermal energy, the installation of biomass co-generation projects (excluding bagasse co-generation) is to be promoted in industry, with at least 50% of power for captive use, and a provision for the surplus power to be exported to the grid. This will increase the use of non-conventional energy sources and conserve the use of fossil fuels such as coal, oil and natural gas. Use of maximum of 25% conventional fuels would be allowed in such projects.

iii) Industrial Co-generation Projects based on Conventional Fuels and their Rejects

The installation of co-generation projects based on conventional fuels such as coal, oil, lignite, gas and un/semi-utilized wastes / rejects like dolochar, coal rejects and refinery muds, etc., is to be encouraged in industry for meeting power and energy requirements.

iv) Other Promotional Activities

Other promotional activities would cover potential / resource assessment, preparation of DPRs, organization of

seminars / workshops / conferences, interactive / business meets, awareness creation activities, and other professional technical services.

4. Central Financial Assistance (CFA)

Central Financial Assistance in the form of capital subsidy would be provided to biomass gasifier projects and biomass co-generation (non-bagasse) projects in industries. However, in respect of co-generation projects based on conventional fuels and their rejects, Central Financial Assistance would be provided only for promotional and awareness creation activities. The details of Central Financial Assistance and other provisions are given below :

4.1 Capital subsidy for Biomass Gasifiers for thermal and electrical applications

- i) Rs. 2.0 lakh / 300 KW_{th} for thermal applications.
- ii) Rs. 2.5 lakh / 100 KW_e for electrical applications through dual fuel engines.
- iii) Rs. 8.00 lakhs / 100 Kw_e for 100% producer gas engines with gasifier system.
- iv) Rs. 6.00 lakhs / 100 Kw_e for 100% producer gas engine alone.

4.2 Capital subsidy for Biomass Co-generation (non-bagasse) projects

Capital subsidy @ Rs. 20.00 lakhs/MW_e would be provided to promoters for installation of Biomass Co-generation (non-bagasse) projects, including captive projects based on direct combustion.

4.3 The capital subsidy will be considered subject to the following :-

- i) The amount of capital subsidy would be calculated on the basis of installed capacity;

- ii) CFA would be limited to a maximum capacity of 5 MW, irrespective of the installed capacity of the project.
- iii) In case of Special Category States (NE Region, Sikkim, J&K, Himachal Pradesh and Uttaranchal), 20% higher capital subsidy than that for General Category States would be provided.

4.4 Incentives for the installation of co-generation projects based on conventional fuels and rejects

Promotional incentives @ Rs. 1.00 lakh / MW, subject to maximum of Rs. 5.00 lakhs/project for professional technical services would be provided to consultancy firms helping to bring a project to financial closure including preparation of DPR.

4.5 Incentives / service charges to SNAs.

Incentives / service charges @ Rs. 1.00 lakh / MW_e (or equivalent) would be provided to SNAs on pro-rata basis, subject to a ceiling of Rs. 5.00 lakh / project, including for Industrial Co-generation projects, for their active involvement in promoting Biomass Power / Co-generation projects .

4.6 CFA for organizing business meets, seminars, workshops, orientation and training programmes, etc.

CFA upto Rs. 3.00 lakh / event would be considered for organization of business meets, seminars, workshops, orientation programmes and training programmes, etc..

4.7 CFA for technology validation, strategic studies, industry-wise sectoral studies and performance monitoring & evaluation etc.

CFA upto Rs. 5.0 lakhs, on case-by-case basis, would be considered for technology validation, strategic studies, industry-wise sectoral studies and performance monitoring & evaluation etc. to institutions / industries. This will be governed by the procedures / guidelines being issued by the R&D Division of MNRE separately.

5. Implementation Arrangements

5.1 The projects will be implemented by private and public sector industry, including through Energy Service Companies (ESCOs), in which case the ESCO would be eligible for the CFA.

5.2 IREDA, other financial institutions or commercial banks shall forward the Detailed Project Reports received from the promoters / ESCOs to the Ministry along with their Appraisal Note indicating the techno-economic viability of the projects, taking into account the eligible capital subsidy. The promoters would be required to also submit an advance copy of their proposal to the Ministry directly. The prescribed format for submission of the proposal is given in the Annexure.

5.3 For projects to be implemented by the promoter without debt financing / loans from domestic FIs / banks, the proposals should be directly submitted to the Ministry for financial support.

5.4 After receipt of DPR from promoters, Appraisal Note and copy of loan sanction order from IREDA / lead bank / FI, and other requisite information / documents from the promoters, the proposal will be examined in the Ministry and sanction will be issued for providing capital subsidy in accordance with the provisions of scheme.

6. Release of Central Financial Assistance (CFA)

6.1 The entire capital subsidy amount would be released directly to the lead bank / lending financial institution for the purpose of offsetting the loan amount after successful commissioning of project as per DPR norms and receipt of copies of statutory clearances and requisite project relating information / documents. The condition of successful commissioning of the project would inter-alia imply operation of the project for three months, including at least 72 hours continuous operation at minimum 80% of rated capacity.

6.2 In case the project is set up by the promoters through their own resources, the CFA would be released directly to promoters after successful commissioning of the project (as per item 6.1 above).

6.3 The incentives to State Nodal Agencies would be released after successful commissioning of the project.

7. Monitoring Mechanisms

7.1 The concerned State Nodal Agencies will closely monitor the execution of the projects and ensure their timely completion.

They would be required to submit periodic progress reports to MNRE.

7.2 MNRE will also monitor the progress of implementation of the projects as well as their performance through a Monitoring Committee consisting of representatives from MNRE, financial institution (s) / banks and State Nodal Agencies.

8. The aforesaid programme is subject to change (s) and modification (s) as may be decided by the MNRE, Govt. of India from time to time, and subject to availability of funds. The Ministry shall in no way be liable for expenditure incurred by promoters for pre-project preparation or other activities, merely on the basis of this circular and / or related announcements by the Ministry. In case of any dispute on interpretation of any provision under the scheme, the decision of the Ministry shall be final and binding.
9. The funds required for the implementation of the programme would be met out of allocated budget of Rs. 4.00 crores from the Budget Head 2810, Bio-energy, Sub-head 03.00.33 – Subsidies, 02.00.31 –Grants-in-Aid, 05.01.33-Subsidies and 05.01.31 – Grants-in-Aid for the year 2005-06 (Plan).
10. This issues in exercise of powers delegated to this Ministry and with the concurrence of IFD, MNRE vide their sanction No. IFD/SAN/106/168/2005-06 dated 25th July 2005.

Yours faithfully,

(R.C. TIWARI)
DIRECTOR

CC:

1. Secretary, Ministry of Environment & Forests.
2. Secretary, Planning Commission.
3. Managing Director, IREDA and other Financial Institutions/ Banks
4. R&D Institutions.
5. Consultants / Consultancy Organizations.
6. Business / Industry Associations.

Copy for information to:

- 1 . PS to MOS (NES)
2. Sr. PPS to Secretary, MNRE.

3. AS & FA, MNRE
4. Sr. Advisor, MNRE.
5. All Advisors/ Joint Secretary
6. All Directors, MNRE
7. All Regional Offices of MNRE.
8. File No. 2/2/2005-UICA

F.No. 2/2/2005 -UICA

Government of India

Ministry of New and Renewable Energy

(Urban, Industrial & Commercial Applications Group)

Block No. 14, CGO Complex

Lodi Road, New Delhi – 110 003

Date : 8th February, 2006

To

- Chief Secretaries of State Governments
- Administrators of Union Territories
- Heads of State Nodal Agencies
- Heads of IREDA / Banks / FIs

Subject : Programme on Biomass Energy and Co-generation (non-bagasse) in Industry for implementation in 2005-06 – reg.

Sir,

I am directed to convey the sanction of the Government of India for incorporating the following modifications with immediate effect in this Ministry's scheme sanctioned vide letter of even number dated 25.07.2005 on the above mentioned subject :

1. The name of the programme hereinafter will be known as "**Programme on Biomass Energy and Co-generation (non-bagasse) in Industry and Institutions**".
2. Capital subsidy for biomass gasifiers coupled with 100% producer gas engine in industry would be as follows :
 - i) Rs. 10.00 lakhs per 100 KWe for 100% producer gas engine with gasifier systems.
 - ii) Rs. 8.00 lakhs per 100 KWe for 100% producer gas engine alone.
3. Deployment of biomass gasifiers with 100% producer gas engines in Institutions for captive use

Institutions such as Engineering / Medical Colleges and Religious / Charitable institutions working purely on non-profit basis and not

registered under Companies Act will also be covered under the Scheme. Institutions that have already set up gasifier system with 100% producer gas engine under SADP programme will not be covered under this Scheme.

The capital subsidy for institutional gasifier systems would be as follows :

- a) Rs. 15.00 lakhs per 100 KWe for 100% producer gas engine coupled with gasifier system.
- b) Rs. 10.00 lakhs per 100 KWe for 100% producer gas engine alone.

4. The rates of subsidy indicated at para Nos. 2 & 3 above would be applicable only for the projects based on spark-ignition IC engines.

5. All other terms and conditions of the sanction dated 25.07.2005 will remain unchanged.

6. This issues in exercise of powers delegated to this Ministry and with the concurrence of IFD, MNRE vide their sanction No. IFD/SAN/106/780/2005-06 dated 20th January, 2006.

Yours faithfully,

**(R.C.
TIWARI)**

DIRECTOR

**Ph.No.
24362356**

CC:

1. Secretary, Ministry of Environment & Forests.
2. Secretary, Planning Commission.
3. Managing Director, IREDA and other Financial Institutions/
Banks
4. R&D Institutions.
5. Consultants / Consultancy Organizations.
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 5. All Advisors/ Joint Secretary
 6. All Directors, MNRE
 7. All Regional Offices of MNRE.

8. File No. 2/2/2005-UICA

ANNEXURE

APPLICATION FORMAT FOR CAPITAL SUBSIDY
(BIOMASS POWER/CO-GENERATION (NON-BAGASSE) PROJECTS IN
INDUSTRY)
PART - A
[TO BE FILLED IN BY PROMOTER & FORWARDED THROUGH LEAD FI]

1. GENERAL

- (i) Name, Address, Phone, Fax & Email of the Promoter. :
- (ii) Name and designation of authorised signatory :
- (iii) Constitution (whether Co-operative/ Private Sector/Public Ltd/ joint sector/Public Sector Company etc.) :
- (iv) Location of the Project :

2. PROJECT DETAILS

- (i) Installed capacity (MW) :
 - (a) Thermal (MW)
 - (b) Power (MW)
- (ii) Capital requirement (MW) :
- (iii) Surplus Exportable (MW) :

3. TECHNOLOGY USED :

(Please specify whether combustion, Gasification, Co-generation etc.)

4. BIOMASS

- (i) Biomass proposed :
- (ii) Quantity required per day :

5. SUPPORT FUEL

Type of other fuels, if proposed to be used as :
Support / supplementary fuel

6. AVERAGE COST OF GENERATION (Rs/Kwh) :

7. FINANCING :

Total cost of project as approved by FIs :

Means of financing

(i) Debt : Equity Ratio :

(ii) Promoter's contribution (Equity) :

(iii) Term loans with rate of Interest (FI wise):

(iv) Any other source :

Loan repayment period (FI Wise)

AUTHORIZED SIGNATORY

PART - B
[TO BE FILLED BY LEAD FINANCIAL INSTITUTION]

i) Name of the Lead FI (and other FIs, Lending to the Project) complete address, telephone number, fax number, e-mail etc., and name & designation of the contact person.	
ii) Whether any application made / proposed to be made for any other financial assistance / grant / loan for the project from any organisation in India or abroad. If yes, please give the source details	
.iii) As, appraised by FI(s)	
Cost of the project (As approved by FIs) 1. Civil Works 2. Plant & Machinery 3. Misc. Equipment	

4. Pre-operative expenses	
5. Others	
Means of Financing (As appraised by FIs)	
1. Promoters / Industry Contribution (equity)	
2. Term loan (FI wise)	
3. Any other sources	
Appraised Installed Capacity (MW)	
Appraised Captive requirement (MW)◆	
Appraised Net / Exportable Power (MW)◆	
Appraised total Term Loan approved (FI wise indicating variable or fixed interest rate)◆	
Techno-economic Viability of Project	
iv) Physical Status of the Project	
v) Anticipated commissioning schedule	
vi) a) Whether power purchase agreement with SEB has been made ?	
b) Status of Statutory Clearances	
viii) Amount of estimated Capital Subsidy eligibility as per GOI sanction order Rs.	

(ix) Enclosure check list / Whether enclosed (Please tick)

1. One copy of DPR as accepted by FI(s) (.....)
2. Copy of PPA / No objection certificate under section 44 (.....)
3. Copy of Statutory clearances / State Government approvals (.....)
4. Authorised / attested copies of loan Agreement (s) (.....)
5. Sanction Order of FI(s) (.....)
6. Appraisal Note of FI(s) (.....)
7. Eligibility check list (.....)
8. Disbursement Schedule (FI-wise) (.....)
9. Any other (please specify) (.....)

AUTHORISED SIGNATORY

PART - C

-

ELIGIBILITY CHECK LIST

**(BIOMASS POWER/CO-GENERATION (NON-BAGASSE) PROJECTS IN
INDUSTRY)**

(To be filled in by Promoter & countersigned by the Lead FI)

Please Tick (v) only one, against each, as applicable.

SL.NO.	PARTICULARS	ITEMS	TICK MARK (only one box)
1.	Biomass Resource Used	a) Forestry based and Agro based industrial residues b) Energy Plantations; Forestry & Agro Residues c) Any other	() () ()
2.	Mix of Fuel	If used whether < 25% (please specify type of fuel and quantity)	()

3.	Configuration / boiler pressure	\geq 100 bar & above \geq 80 bar - \geq 60 bar \geq 40 bar	() () () ()
4.	Debt / equity ratio	4:1 3:1 3:2 2:1	() () () ()
5.	Technology Route Used	a) Steam Turbine b) Gas / Steam Turbine c) Gas Turbine Engine d) Dual Fuel Engine e) Any other (Please specify)	() () () () ()
6.	Details of loans	a) Date of sanction of loan by FI (FI wise)	

		<p>b) Whether Loan Agreement(s) signed (Please mention date FI wise)</p> <p>c) Whether any disbursement of Term Loan made. (if yes, date and amount disbursed)</p>	
7.	Power Purchase Agreement/ Wheeling Agreement	<p>a) Whether Signed</p> <p>b) Yet to be Signed</p> <p>c) Not Required</p>	<p>()</p> <p>()</p> <p>()</p>
8.	Whether applied for any other assistance / grant from any Organisation/State Government including International Agency (please specify name & quantity of assistance expected/available)	<p>a) Yes</p> <p>b) No</p>	<p>()</p> <p>()</p>

AUTHORIZED SIGNATORY

PART - D

FORMAT FOR BASIC INFORMATION FOR PROJECTS ON BIOMASS GASIFIER SYSTEMS FOR THERMAL AND ELECTRICAL APPLICATIONS, 100% PRODUCER GAS BASED PROJECTS AND CONVERSION OF EXISTING POWER PLANTS.

Name and address of State Govt. Nodal Deptt./Nodal Agency/Approved NGOs
:

Sl. No.	User's address Mode of application	Name of Manufacturer / Supplier	Rating of system Thermal/ Mech./ Electrical	No. of systems proposed	Unit Cost Estimate/ actual price as intimated by the user/ manufacturer	Amount of Central Financial Assistance (CFA) as per approved scheme of Biomass Gasifier 2005-2006.

Certified

that:

1. Certified that adequate quantity of surplus biomass is available at the site and user/applicant is genuinely interested for installation and operation of gasifier on regular basis.
2. User Industry has agreed to provide balance funds over and above CFA for installation of proposed gasifier system.
3. User Industry has agreed to operate and maintain the system at their own on a regular basis.

Name
Promoter/User
(Counter)

Signature of the
(Signed by SNA or / and Manufacturer)

Date:
Place:

LIST OF GASIFIER MANUFACTURERS IN INDIA

1.	Dr. B.C. Jain , Managing Director, M/s Ankur Scientific Energy Technologies Pvt. Ltd Near Old Sama Jakat Naka , Vadodara – 390008 Tel: 793098 / 794021 Fax: 0265- 794042	7.	Mr. G.M. Satyanarayna , Managing Partner, M/s Associated Engineering Works, P.B No. 17, Gamini Compound Chivatam Road, Tanuku – 534211 Tel.: 08819-22950 Fax : 08819- 24801
2.	Mr. B.V. Ravi Kumar, Director M/s Cosmo Powertech Pvt. Ltd.Devpuri , Near Jain Public School, Dhamtari Road, Near Raipur – 492015 Tel: 0771-5011262 Fax: 0771-5010190 E-mail :Cosmo	8.	Mr. J Mukherjee, Director M/s Grain Processing Industries (I) Pvt. Ltd., 29, Strand Road Calcutta – 700001 Tel: 033-2431639/2101252 Fax: 91-33-2204508 / 2103368

	powertech@yahoo.co.in		
3.	Mr. K. Ramachandra, M/s Netpro Renewable Energy (India) Ltd., 139/B, 10th Main, Rajmahal Vilas Extension, Bangalore - 560080 Tel: 080- 3613585 / 3613457 Fax: 080- 3611584 Res. 3232640 E-mail: netpro1@vsnl.com	9.	Mr. Sudhir Chandra, Chartered Engineer, M/s Chanderpur Works, Yamuna Nagar - 135001. Haryana Tel: 01732-250546 / 250964 / 251866 Fax: 01732 - 279852 E-mail: sudhiryn@sancharnet.in New Delhi (Tel.) 26317811
4.	Energreen Power Limited No. 1 Ashre 4B 2nd Street Nandanam Extension Chennai - 600035 Tel.: 044- 24321339 / 52111348 Fax: 044- 24321339	10.	XYLOWATTSA EnBudron A 12 CH-1052 Le Mont s/Lansanne Switzerland Tel: 44121 - 6516969
5.	Sh. H.R Jaiswal, Managing Director Rishipooja Energy & Engineering Company, M.G. College Road Gorakhpur - 273001 (U.P.) Tel: 0551- 340612 / 339475	11.	Sh. V.V.N. Kishore TERI, India Habitat Centre Lodi Road New Delhi- 110003
6.	Bioresidue Energy Technology Private Ltd. S-2, Dig Vijay Apartment 1st Cross Ganesha Block, Sultanpalya R.T Nagar P.O, Bangalore 560032 Tel: 080- 3431533 Fax: 080- 3534503		