SMALL SCALE BIOMASS PDD METH AND BASELINE EMISSIONS CALCULATION

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Agenda

- Present Scenario
- Eligibility Criteria for SSC Projects
- Applicable Methodologies
- Baseline emission calculations of applicable methodologies
- Illustration of the baseline and its other alternative scenarios
- Additionality

Present Scenario

- Biomass refers to plant matter grown for use as biofuels. Biomass is a renewable fuel and is called as “carbon neutral” fuel.
- In the list of small scale registered projects – approximately 50 – 60 % projects are based on meth AMS I.D, 10 – 15 % projects are based on meth AMS I.C and only 2 – 3 % projects are based on AMS I.A.

Recently Registered Projects

Project Registered Code & Year	***Project Specification***	***Type***	***Technology Used***
1739 & 6 Jan 08	6 MW Rice husk based cogeneration plat at Bhageshwari papers Pvt Ltd.- AMS I.C. ver.9	Rice husk Based	The capacity of the project shall be less than 45 MW th of thermal generation capacity.
1167 & 3 Dec 07	Biomass gasification based power generation by Arashi-Hi Tech Bio-Power Pvt Ltd.- AMS I.A. ver.9	Sesbania and other bio- species	The applicability is limited to households and users that do not Have a grid connection
1295 & 26 Nov 07	10 MW Biomass based power project of Ind power Ltd.- AMS I.D. ver.9		Renewable biomass, that supply electricity to and/or Displace Electricity from an electricity distribution system that is or would have been supplied by At Least one fossil fuel fired generating unit.
1312 & 23 Nov 07	Nagamas biomass cogeneration project in Indonesia. AMS I.C. ver.9 & I.D.ver.9	Rice husk	The capacity of the project shall be less than 45 MW th of thermal generation capacity.

Eligibility Criteria for Small Scale Projects

This is as follows:

- Renewable energy projects with output capacity up to 15 MW
- Energy Efficiency improvement projects, which reduces energy consumption on the supply and/or, demand side up to 15 GWh annually
- Other project activities that both reduce emissions by sources and directly emit less than 15 thousand tonnes CO2 equivalent annually

Applicable Methodology

For Small Scale biomass project applicable methodologies are as follows:

1. AMS – I.A – Electricity generation by the user
2. AMS – I.C – Thermal for the user with or without electricity
3. AMS – I.D – Grid connected renewable electricity generation

Baseline calculation for AMS – I.A (Electricity generation by the user)

The energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity

EB y = i * *O*i / (1-*l*)

Where :

***i* =** number of generating units

*O*i **=** total estimated annual output in kWh per year

l = Transmission and distribution losses that would have been observed in the diesel powered mini-grids

Then,

BE y = EB y * EF y

Baseline calculation for AMS – I.C (Thermal energy for the user with or without electricity)

There are different baseline scenarios for co-generation projects. The baseline calculation of different scenarios is as follows:

1. If the pre project activity is electricity from HSD based DG sets and steam from FO & saw dust based boiler.

Process steam	TPH	6
Temperature	oC	240
Pressure	Kg/CM2	10.54
	TJ	139
ηth		0.90
Emission Factor tCo2/TJ		77.4
Baseline Emission\ steam		**11921**

Intalled capacity	MW	2.42
Loading capacity	MW	1.65
Gross Generation	GWh	9.801
Auxillary Consumption	GWh	1.47015
Net Generation	GWh	8.33085
Conversion factor	TJ/GWh	3.6
	TJ	29.99106
Emission Factor tCO2/TJ		74.1
ηth		0.35
Baseline Emission Power		**6350**

Baseline calculation for AMS – I.C (Thermal energy for the user with or without electricity)

2. If the pre project activity is purchasing electricity (100%) from the state grid and steam from FO & saw dust boiler.

Process steam	TPH	6
Temperature	oC	240
Pressure	Kg/CM 2	10.54
	TJ	139
ηth		0.90
Emission Factor tCo2/TJ		77.4
Baseline Emission team		**11921**

Intalled capacity	MW	2.42
Loading capacity	MW	1.65
Gross Generation	MWh	9801
Auxillary Consumption	MWh	1470.15
Net Generation	MWh	8330.85
Emission Factor tCO2/MWh		0.81
Baseline Emission Power		**6748**

Baseline calculation for AMS – I.C (Thermal energy for the user with or without electricity)

3. If the pre project activity is the combination of electricity from grid and during non-availability of grid based electricity , electricity from HSD based DG sets and steam from FO & saw dust based boiler.

   This the conservative approach of above two scenarios therefore the baseline emission is calculated on the basis of percentage of emission factors of grid as well as of the fO.

Baseline calculation for AMS – I.D (Grid Connected Renewable Electricity generation)

If the project activity is replacing grid supply then the emissions baseline (BE y) is the product of the energy baseline (EG y) and the CO2 emissions coefficient (EF y) for the fuel displaced (grid factor)

BE y = EG y * EF y

where EG y & EF y is calculated as follows:

EG y = Capacity (MW) * No of operating hrs * No of operating days * Plant Load factor

Say, for example

EG y = 6 MW * 24 * 330 * 75%

EG y = 35640 MWh

Baseline calculation for AMS – I.D (Grid Connected Renewable Electricity generation)

EF y is the baseline emission coefficient taken as the average of the approximate operating margin (50%) and the build margin (50%), and therefore combined margin is taken.

Say, for Northern grid

	t CO2 / MWh
Simple OM, EF_{OM}	.99
Build Margin, EF_{BM}	.63
Combined Margin, EF_{CM}	.81

BE y = 35640 * .81

= 28868 t co2

Illustration of the baseline and its other alternative scenarios

Alternate Scenario	*Investment Barrier*	*Technological barrier*	*Barriers due to prevailing practice*	*Other Barriers*
Continuation of current practice in absence of project	No investment	No	No	No
Purchasing electricity (100%) from the state grid and steam from FO & saw dust boiler	Yes , minimal	No	No	No
Electricity from grid as well as from HSD based DG sets and steam from FO & saw dust based boiler	Yes, minimal	No	No	No

Illustration of the baseline and its other alternative scenarios

Alternate scenario	*Investment barrier*	*Technological barrier*	*Barrier due to prevailing practice*	*Other barriers*
Captive Co-generation plant, using Fossil fuel (coal)	Yes, the proponent needs to invest in this option.	Yes, the project proponent has no prior experience in fossil fuel based boiler operation and therefore no technical barrier in this option	No	No
Captive Co – generation plant, Using biomass as primary fuel i.e., Project activity	Yes, the project proponent needs to invest in this option.	Yes, the project proponent has no prior experience in biomass based power plant.	No	No

Illustration of the baseline and its other alternative scenarios

From the above analysis it is clear that the above discussed alternative scenarios can be a baseline scenario. The project activity cannot be a baseline option because the project activity faces maximum barrier for implementation and the above choice is made; as the baseline scenario for the project activity is the generation of steam for process from furnace oil based boilers and electricity generation from HSD based DG sets.

Additionality

Major barriers for proving additionality

Technological barrier

- First of its kind
- Process fluctuation.
- Sourcing of the equipment and the logic & control for its operation
- Infrastructure for the project activity – availability of land.
- Availability of skilled manpower to operate the plant continuously and efficiently.

Investment barrier

- The size of investment associated with the project activity
- Sensitivity analysis for price of biomass during conceptualization of the project activity as well as with the current price– seasonal variation as well as increase in the demand of biomass,
- Sensitivity analysis of cost of power

Thank You