FUEL SWITCHING

BIODIESEL

Baseline Methodology of CDM Project

SECTION A. Identification of methodology

- Approved baseline methodology AM0008
- Industrial fuel switching

A.1 Proposed methodology title

Industrial fuel switching from fossil diesel to biodiesel fuel blend without extension of capacity

A.3 Conditions under which the methodology is applicable to CDM project activities

This methodology is applicable to a project activity, which is to switch the industrial fuel currently used in existing power plant facility for the generation of island grid electricity to a blend biodiesel fuels that would continue to used during the crediting period under the following condition:

- The local regulations/programs do not constraint the facility from using petroleum/alternative fuel;
- The proposed project activity is defined as fuel switching applied to four stroke compression ignition engine (IEC) and does a not result in integrated process change.

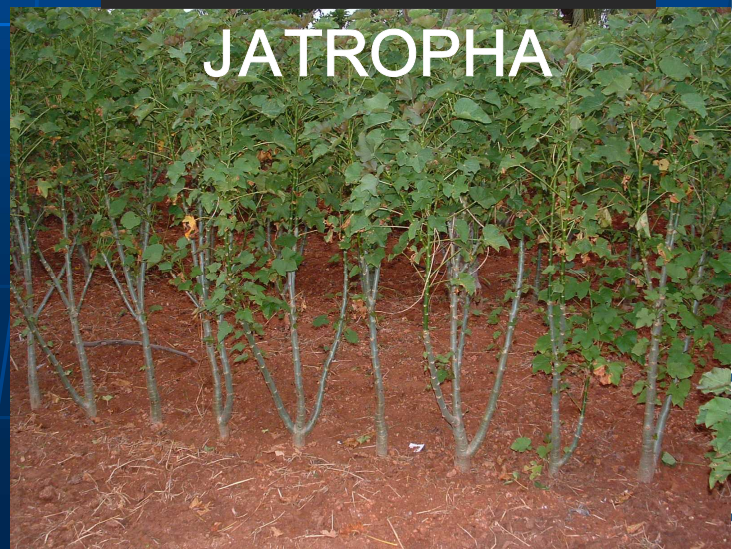
SECTION B. Overall summary description

The project shall utilized the biodiesel from an indigenous crop, Jatropha curcas, locally known as "tuba tuba" as fuel blend for the power plant in Marinduque island. The use of biodiesel from the Jatropha tree is perceived as a first of its kind in the Philippines.

- The project is a Biodiesel Utilization which is a blend of Coco-Biodiesel and Jatropha Biodiesel to displace 20% of fossil fuel used for power generation of small island grid electricity.

Boundaries

- Biodiesel crop farming
  - Cheap to plant and maintain
  - Trees live for 50 years – produce for 30
  - Easy to crop – grows again
  - Plant - grow – harvest
  - No critical harvest time
  - Trees grow without fertilizers or irrigation
  - Grows well on degraded land



Boundaries

- Biodiesel processing – extraction of oil from the seeds and processing said Jatropha oil into an ester product or Biodiesel.

- Fully automated refining process
- Produces 22,000 litres of fuel per day Fuel refinery installed in one day
- Full warranty on fuel usage
- Quality controlled
- Equipment installed in a moveable container van

Boundaries

- Fuel source
  - Jatropha crop seed yield – 12 MT/ha/yr
  - Oil seed content – 35%
  - Coco-Biodiesel
- Land requirement to sustain the operation of 20MT/day biodiesel refinery

20MT/day*300days/year = 6,000MT/yr

Land R = 6,000MT/year ÷ (12MT/ha/year*0.35)

Land R = 1,428.57 hectare

C.1 General Baseline approach

- The baseline scenario for the project, which is eligible to use this technology, is that the current fuels are continued to used in the existing facility at least up to the end of the crediting period without any retrofit, which extends its capacity or lifetime, or improved its fuel efficiency.

Baseline Emissions (BE)

$BE = \Sigma\ QF\_TJ\ (EF\_F\_CO_2 + FC\_F\_N_2O * GWP\_N_2O)$

In the absence of Quantity of fuel used the following computation is applied

Equivalent power generated in TJ = (12 mw x 24 hrs x 1000 kwh/1mw) ($3.6x10^6$ J/1kwh) ($1TJ/1x10^9$ J)
12 mw = 1036.8 TJ energy fuel (Capacity Factor_67%)
12 mw = 694.656 TJ

BE = 694.656 TJ x 20 ton C/TJ
BE = 13,893.12 ton of C per day x 300 days per year

BE = 4,167,936 ton of C per year

Project Activity

- The activity is to switch the fuel with existing electric power plant processing facility
- The project emissions PE (measured in ton of C equivalents_ t C/year) is expressed as:

PE = 1036.8 TJ/day x 20% biodiesel blend x EF_F
= 1036.8 TJ/day x 0.20 x 20 ton C/TJ (PF_67%)
= 2,778.624 TJ/yr

PE = 2,778.624 ton of C/day x 300 day/year

PE = 833,587.2 ton of C per year

Emission Reduction

The emission reduction ER by the project is expressed as:

ER = BE – PE

= 4,167,936 - 833,587.2 (ton of C per year)

ER = 3,334,348.8 tons of C per year

Additionality

- Additionality relates to the first and second applicability conditions mentioned above.
- The economic investment analysis shall use net present value (NPV) analysis the following parameters:
  - Investment requirements for fuel switching;
  - A pioneering project;
  - Current price and projected price (variable cost) of each fuel;
  - Difference in operating costs for each fuel (like, fuel handling and maintenance cost)
  - Lifetime of the project, equal to the remaining lifetime of the existing equipment(s); and
  - Equipment replacement cost if any during the project lifetime

Monitoring Methodology

- For fuel switching part, CO2 emission factors EF_F, and EF_BF – these values are fixed throughout the crediting period – are calculated or referred from some statistical document like IPCC Good Practice Guidance on greenhouse gases (GHG) Inventory and Uncertainty Management ex-ante in the Project Design Document
- For each element process n, the fuel efficiency η_n_F, are measured ex-ante before switching the fuel as a function of load factor. On the other hand, η_n_BF (also a function of load factor) is measured at an early stage after implementation of the project. By using the measured quantity Q_n_BF (times ηn_BF divided by the η_n_F), the baseline fuel consumption of each element process Q_n_F is calculated. Qn_BF is also independently measured.
- Applicability concerning the local regulations are checked (i.e. listed as monitoring items);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Thank you
for your time and attention