RENEWABLE ENERGY CDM PROJECTS-TWO EXAMPLES

Example 1 – Small Scale hydro project in Fiji

Project Description : Vaturu and Wainikasou small-scale hydro project

- The Vaturu and Wainikasou projects are small-scale run-of-river hydro projects in Fiji implemented by Sustainable Energy Limited (SEL), a joint venture between the Fijian Electricity Authority (FEA) and a hydro project developer, Pacific Hydro Limited (PHL).

- Total installed capacity of the Vaturu and Wainikasou projects are 3MW and 6.5MW, respectively.

Project Participant - Sustainable Energy Limited (SEL), project developer and ABN AMRO BANK N.V

Methodology Employed - AMS-I.D. ver. 5 - Grid connected renewable electricity generation

Example 1 – Small Scale hydro project in Fiji

Additionality Criteria – Shown using Barrier Analysis

Financial Barrier :

- The capital cost for these small hydro was comparatively much higher than the common practice (diesel plant).
- In adequate compensation (power tariff) for the high risk taken by PP for implementing the project.

Barrier Due to prevailing practice/ Technical Barrier :

Lack of technical expertise in hydro technology development on the island.

Lack of any support mechanism for development of RE sector

Project Boundary

Project boundary is upto the grid connection. In this case as the grid are not inter connected the grid only relates to the main island in Fiji – Viti Levu.

Example 1 – Small Scale hydro project in Fiji

Formula Used

Baseline Emissions

$\mathbf{BE_y = EG_{BL,y} * EF_{CO2,grid,y}}$

BE_y - Baseline Emissions in year *y* (t $CO_{2)}$

$EG_{BL,y}$ - Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

$EF_{CO2,grid,y}$ -CO_2 emission factor of the grid in year *y* (tCO_2/MWh)

Example – Small Scale hydro project in Fiji

$$\mathbf{EF_{CO2,grid,y}\ or\ EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}}$$

where

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)

w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of build margin emissions factor (%)

Example 1– Small Scale hydro project in Fiji

Project Emissions

There are no project emissions in this RE project.

Leakage

As no energy generating equipment is transferred from another activity, leakage is considered to be zero.

Example 1 – Small Scale hydro project in Fiji

Emission Reduction

- 24,928 tCO2 per annum

Parameter	Unit	Value
Grid Emission Factor	tCO2/MWh	0.656
Power Exported	MWh/annum	38,000
Emission Reductions	tCO2/annum	24,928

Example 2 – Small Scale Solar project in Thailand

Project Description : 5 MW Photovoltaic Power Generation Project at Saraburi province, Thailand

- The project aims to install a photovoltaic (PV) power plant at Kang Koi district Saraburi province in the middle part of Thailand. The PV power plant has total installed capacity at 5.0 MW, which is composed of 23,138 sets of PV module.
- This project is expected to generate approximate 7,401 MWh per annum and export to the national grid
- Developed by Infinite Green Co., Ltd. (IGC)

Project Participant - Infinite Green Co., Ltd. (IGC) ,Thailand

Methodology Employed - AMS-I.D. ver. 16 - Grid Connected renewable electricity generation

Example 2– Small Scale Solar project in Thailand

Additionality Criteria – Shown using Investment Analysis

Investment Barrier

The calculation of project returns over its useful life works out to be **7.48%** which is below the Weighted Average Cost of Capital (WACC) of **11.15%**

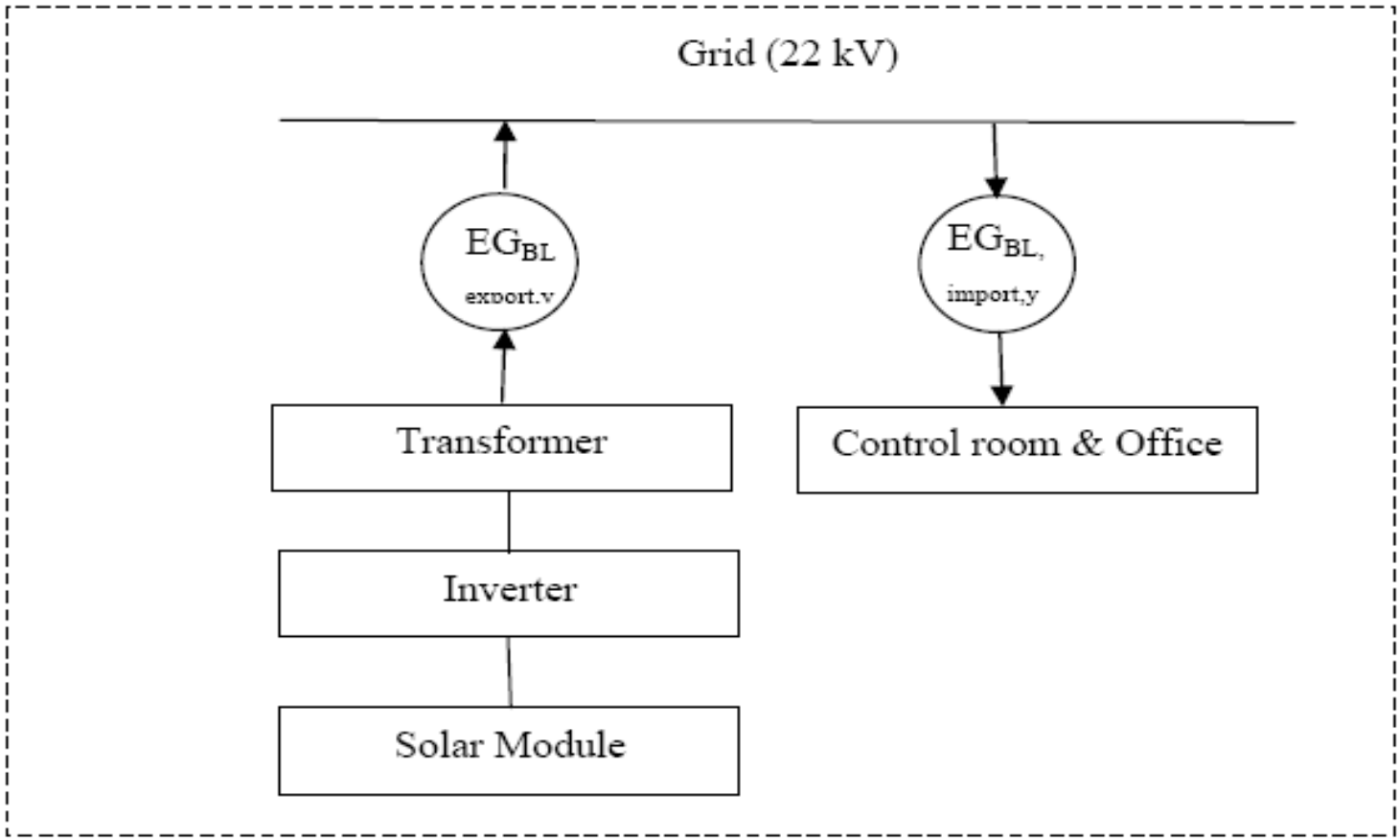
Barrier Due to prevailing practice

The electricity generation by photovoltaic power plant had a negligible share in total power generation.

Prevailing practice of electricity generation in Thailand is generated by fossil fuel.

Example 2 – Small Scale Solar project in Thailand

Project Boundary



Example 2 – Small Scale Solar project in Thailand

Formula Used

Baseline Emissions

$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$

BE_y - Baseline Emissions in year *y* (t $CO_{2)}$

$EG_{BL,y}$ - Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

$EF_{CO2,grid,y}$ -CO_2 emission factor of the grid in year *y* (tCO_2/MWh)

$$EF_{CO2,grid,y} \text{ or } EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$$

where

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)

w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of build margin emissions factor (%)

According to "Tool to calculate the emission factor for an electricity system (Version 2)", the weights of OM and BM for hydro and solar projects will be $w_{OM} = 0.75$ $w_{BM} = 0.25$

	Weighting emission factor	CO_2 emission factor (tCO_2/MWh)
$EF_{grid,OM,2006\text{-}2008}$ (tCO_2/MWh)	75%	0.5088
$EF_{grid,BM,2008}$ (tCO_2/MWh)	25%	0.5463
$EF_{grid,CM,y}$ (tCO_2/MWh)		**0.5181**

Example 2 – Small Scale Solar project in Thailand

- **Baseline Emissions due to avoided grid electricity (tCO2e) (in year 2012)**

$$BEy = EG_{BL,y} * EF_{CO2,grid,y}$$

$$= 7728.708 * 0.5181$$

$$= 4,004$$

Example 2 – Small Scale Solar project in Thailand

Project Emissions

There are no project emissions in this RE project.

Leakage

As no energy generating equipment is transferred from another activity, leakage is considered to be zero.

Example 2 – Small Scale Solar project in Thailand

Emission Reductions

Year	Estimation of baseline emissions reductions (tCO_2e)	Estimation of project activity emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of Emission reductions (tCO_2e)
2011 (Nov-Dec)	607	0	0	607
2012	4,004	0	0	4,004
2013	3,964	0	0	3,964
2014	3,925	0	0	3,925
2015	3,885	0	0	3,885
2016	3,846	0	0	3,846
2017	3,808	0	0	3,808
2018	3,770	0	0	3,770
2019	3,732	0	0	3,732
2020	3,695	0	0	3,695
2021 (Jan-Oct)	3,109	0	0	3,109
Total	**38,346**	**0**	**0**	**38,346**

THANK YOU!