Appendix I

Additional Information on the Proposed Methodology
"Installation of Electric Heat Pump Type Water Heater for Hot Water Supply Systems**"**

1. Market share of boiler manufacturers in Costa Rica

The market of boilers in Costa Rica is dominated primarily by three (3) main manufacturers, CompanyA, Company B, CompanyC, which have the share of 90% in the market altogether. All of them offer peritubular boiler to produce steam and thermal oil for different processes including water heating in hotels in the market according to the survey and an interview.

2. Market share by fuel used for boilers in Costa Rica

The major three manufacturers offer boilers fired with natural gas, diesel and heavy oil in the market according to the survey and an interview. Among those, the efficiencise of small scale boilers at the range of around 50kW by a fuel type are summarized below.

Table 1: Boiler Efficiency by fuel type

Boilers for industrial application sold in Costa Rica (at the capacity range of around 56kW)	By Fuel Type	Boiler efficiency (%)
CompanyA	Natural Gas	84%
	Diesel	84%
	Heavy Oil (Bunker)	80%
Company B	Natural Gas	78%
CompanyC	Natural Gas	90%
	Diesel	80%
	LPG	85%

(Source: Costa Rica Boiler Market Research Report 2017 by Grand Research Store)

3. Default boiler efficiency

The default efficiency of the reference equipment for heating energy generation is set as 92% based on the CDM methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems ver. 2.0", which is more efficient than the result of the market survey in Costa Rica. This manner achieves net emission reductions.

Table 2 : Default efficiency for thermal applications

Technology of the energy generation system	Default efficiency
New natural gas fired boiler (w/o condenser)	92%
New oil fired boiler	90%
Old natural gas fired boiler (w/o condenser)	87%
New biomass fired boiler (on dry biomass basis)	85%
Old oil fired boiler	85%
Old biomass fired boiler (on dry biomass basis)	80%
Old coal fired boiler	80%
Other	100%

(Source: TOOL09 Methodological tool: determining the baseline efficiency of thermal or electric energy generation systems Version 2.0, United Nations)