

## NOTE ON GREENHOUSE GAS REDUCTION ESTIMATION

### A. GHG Calculations

#### 1. Sub-project: Distributed Solar PV at Distribution Sub-Stations

Particulars	Value	Unit
Total capacity for the proposed project	160	MW
Capacity Utilization factor (average in India)	19	%
Annual generation output (Megawatt-hours)	266,304	MWh
Grid electricity factor (combined margin)	0.92	tCO <sub>2</sub> e/ MWh
Estimated average annual emission savings from the proposed project	245,000	tCO <sub>2</sub> e/ year
Life of solar plant	25	Year
Estimated lifetime emission savings (25 years)	6,124,992	tCO <sub>2</sub> e/ lifetime

**NOTE:** only the solar PV component is counted for purposes of GHG reductions attributable to the overall project. GHG estimates for the smart metering and electric vehicles are shown below to illustrate the potential reductions.

#### 2. Sub-project: Smart Meters and other Intelligent Energy Management elements (“Smart Grid”)

##### Smart metering and energy management

Parameter	Value	Units
EESL Target for SM	5,000,000	Number
Grid emissions factor	0.92	tCO <sub>2</sub> / MWh
Sample electricity consumption (Satguru)	1,764,500	kWh / Year
Sample number of customers (Satguru)	1,000	Number
Emission (current) for sample case	1,623.34	tCO <sub>2</sub> / Year
Commercial loss reduction ratio	2.00%	%
Technical loss reduction ratio	2.00%	%
Total loss reduction ratio	4.00%	%
Reduced emission (after SM+AMI) for sample case	64.93	tCO <sub>2</sub> / Year
Reduced emission (after SM+AMI) for all EESL target	324,650	tCO <sub>2</sub> / Year
EESL SM business model duration	8	Years
Reduced emission (after SM+AMI) for all EESL target for project duration	2,597,200	tCO <sub>2</sub>

#### 3. Sub-project: E-Mobility with Electric Vehicles and Charging Stations

Parameter	Value	Units
Energy consumption per km	115	Wh/km
Units consumed per km	0.115	kWh/km
Charger efficiency	90%	%
Units consumed at charger input per km	0.128	kWh/km
Total run of vehicle per annum	24,960	km

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Total units consumed per annum	3,189	kWh
Tariff Rate	7	INR/kWh
Total Fuel Cost	22,325	INR
T&D losses	15%	%
Units generated	3,752	kWh
Grid emissions factor	0.92	tCO <sub>2</sub> e/MWh
Emission from grid	3.08	tCO <sub>2</sub> e
<b>Emissions by Diesel Vehicles</b>		
Average	15	km/lit
Consumption of liters per km	0.0667	lit / km
Total run of vehicle per annum	24,960	kms
Total diesel consumption	1,664	liters
Emission per liter	2.68	kgCO <sub>2</sub> e/liter
Emission from vehicle	4.46	tCO <sub>2</sub> e
<b>Tail Pipe emission</b>		
Tail pipe Emission Reduction	1.01	tCO <sub>2</sub> /vehicles
Total Number of vehicles for the proposed project	10,000	Number
Number of EVs deployed till date	125	Number
EESL Target for EV	500,000	Number
Total number of ICE based cars at country level	4,000,000	Number
Lifetime of Project	10	years
Emission reduction	10,075	tCO <sub>2</sub> e/ years
Lifetime emission reduction	100,754	tCO <sub>2</sub> e

## **B. Climate Change Financing**

4. Following ADB guidance, 100% of the solar PV component (\$61.2 million from ADB and \$46 million from CTF) and 30% of the smart metering component of \$157 million (\$47.1 million) are counted as climate change financing (mitigation). Total climate finance counted is \$154.3 million, of which \$108.3 million is from ADB.