



**COMPONENT PROJECT DESIGN DOCUMENT FORM FOR
SMALL-SCALE COMPONENT PROJECT ACTIVITIES (F-CDM-SSC-CPA-DD)
Version 02.0**

COMPONENT PROJECT ACTIVITIES DESIGN DOCUMENT (CPA-DD)

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

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Low cost irrigation devices programme in India

Version: 01

Date: 18/09/2012

A.2. Title of the CPA

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Low cost irrigation devices programme in India “VPA02”

Version: 01

Date: 18/09/2012

A.3. Description of the CPA

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The proposed small scale VPA “Low cost irrigation devices programme in India “VPA02” is a voluntary activity, which involves installation of 28035 treadle pumps as a part of “Low cost irrigation devices programme in India” PoA.

The Low cost irrigation devices programme in India is a voluntary Gold Standard Programme of Activities (PoA) that aims to address the need for irrigation in India and facilitates marketing of a low cost and clean irrigation device - Treadle Pump (TP). The purpose of the proposed PoA is dissemination and installation of TPs to provide for a basic irrigation means to farmers in India.

In India, the irrigation sector is dependent on either ground water or surface water as main source for water. Groundwater irrigation is accessed by dug wells, bore wells, tube wells and is powered by electric pumps or diesel engines¹. Extensive use of electric and/or diesel pumps results in shallower dug wells to fall dry causing problems for poor people². A TP is a foot operated water lifting device that can irrigate small plots of land in regions that have high water table. The TP technology can effectively bridge the gap between the existing demand for irrigation services and the poor paying-capacity of farmers, while utilizing the existing irrigation potential in the form of groundwater resource.

Under the PoA, TPs installed shall replace/offset the use of diesel/fossil fuel based irrigation pumps which would have otherwise been used in the absence of the PoA.

All Project Participants including the VPA implementer are voluntarily taking part under this program. There is no mandatory law/regulation that mandates the installation of TPs in India.

A.4. Entity/individual responsible for CPA

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The VPA implementer of the proposed VPA is IDEI. It is also a project participant as per the PoA-DD. IDEI is responsible for collecting information necessary for monitoring.

¹ <http://www.iitk.ac.in/3inetwork/html/reports/IIR2007/07-Irrigation.pdf>

² http://www.samsamwater.com/library/TP40_9_Pumping.pdf

J.P. Morgan Ventures Energy Corporation (JPMVEC) is the coordinating/managing entity (CME) for this PoA and is also a project participant as per the PoA-DD.

A.5. Technical description of the CPA

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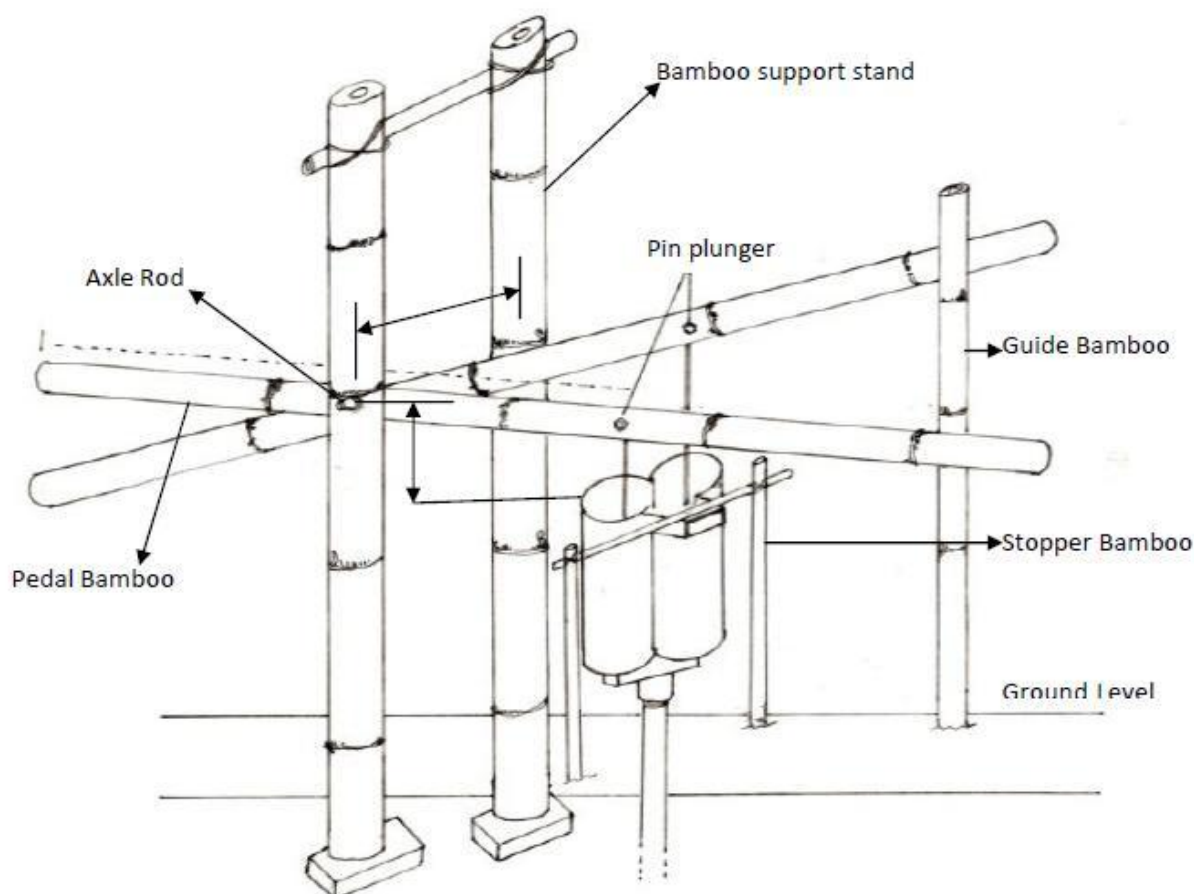
Scenario existing prior to the implementation of the project activity:

Prior to the implementation of the project activity, irrigation demand for agriculture was primarily met by diesel/fossil fuel based pumps³. This is the same as the baseline scenario. Combustion of diesel/fossil fuel in such pumps, in the baseline, leads to CO₂ emissions. Under the proposed programme diesel/fossil fuel based pumps shall be replaced by TPs. The technology of the TPs has been described as follows:

Technology employed by the programme:

TP is a simple foot operated water lifting device developed for pumping water for irrigation⁴. TPs can be used to cultivate a large variety of crops. Pumping is activated by stepping up and down on treadles which drive pistons, creating cylinder suction that draws groundwater to the surface⁵.

Figure 1: Technical diagram of treadle pumps

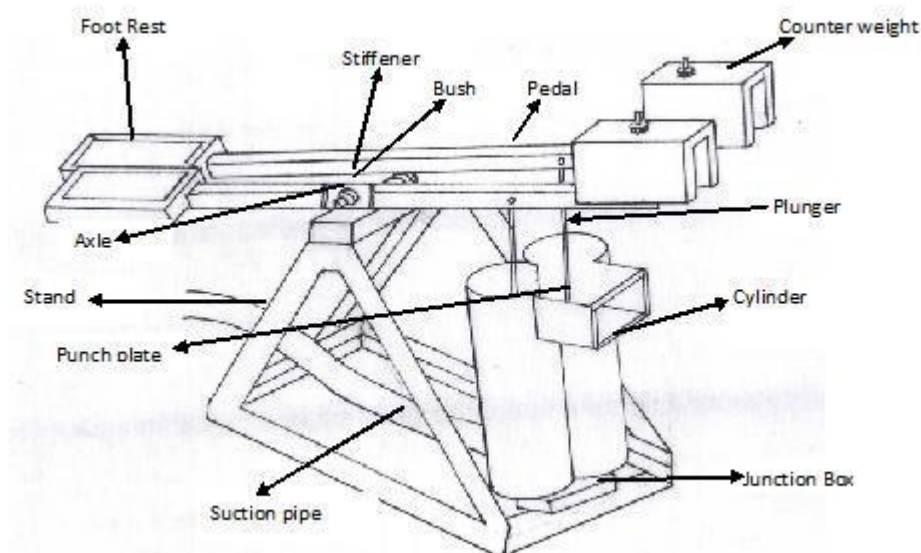


³ <http://www.iitk.ac.in/3inetwork/html/reports/IIR2007/07-Irrigation.pdf>

⁴ <http://www.sustainergyweb.eu/practicalinfo/treadle-pumps/>

⁵ <http://www.sustainergyweb.eu/practicalinfo/treadle-pumps/>

Bamboo Treadle Pump



Surface Treadle Pump

Bamboo and Surface treadle pump are part of this VPA. The technical description and specifications of these pumps are described in the table below:

Maximum Suction Lift:	8 meters.
Water quality:	Resistant to silt particles but not suitable for saline water.
Irrigation:	Suitable for all type of crops in an area up to 0.4 ha (4000 sq m).
Raw Material:	CRC (Cold Rolled Coil) sheet & mild steel.
Operator's weight:	Operate easily with 35-40 kg operator's body weight.
Deliver system:	Deliver water through open channel flow at atmospheric pressure.
Pump type:	3.5 inch diameter (each) twin barrels.
Maximum Flow:	4500 Litres per hour.
Maximum Stroke Length:	100 mm

Surface Treadle Pump: is a foot operated reciprocating type positive displacement pump to draw water with open channel water delivery system from surface water source like dug well, ponds, canal etc.

A pair of metal pedals integrated with counter weight, foot rest and bush bearing provides ease of operation & smooth pedals movement.

Bamboo Treadle Pump: is a foot operated reciprocating type positive displacement pump to draw water with open channel water delivery system from shallow tube wells A pair of 6 ft long bamboo pedals used to leverage the pedal's up & down movement.

Operational lifetime:

Estimated operational lifetime of TP is 10 years. (Refer: TERI Report no. 2006RR24, section 3.3.2, Page 13).

Type and level of service in the baseline:

Please refer section D.2 for a detailed description of the baseline for the same type and level of services as provided by the CPA.

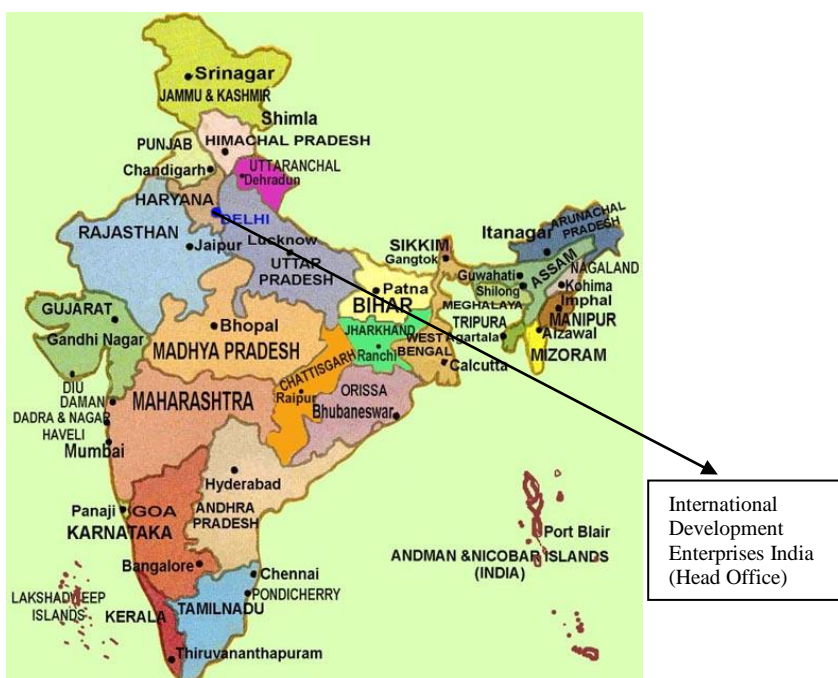
A.6. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) CPA implementer(s) (as applicable)	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
India (Host)	International Development Enterprises India (IDEI) (Private Entity)	No
United Kingdom of Great Britain and Northern Ireland	J.P. Morgan Ventures Energy Corporation (“JPMVEC”) (Private Entity)	No

A.7. Geographic reference or other means of identification

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The boundary of the VPA is limited to the political boundary of India, where the treadle pumps are installed.



Since, each sub-unit in the VPA is uniquely identified with a unique identification number, each small scale VPA can be uniquely identified.

A.8. Duration of the CPA

A.8.1. Start date of the CPA

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01/01/2009 - Date of sale of the first TP included in the VPA.

A.8.2. Expected operational lifetime of the CPA

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10 years, 0 months

A.9. Choice of the crediting period and related information

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Fixed Crediting period

The duration of crediting period of the proposed VPA shall not extend beyond the lifetime of the PoA.

A.9.1. Start date of the crediting period

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01/01/2011 – Date of sale of the first TP included in VPA or 2 years prior to the date of registration of the PoA or 2 years prior to the date of inclusion of the CPA under the PoA, whichever is later.

A.9.2. Length of the crediting period

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10 years (Fixed)

NOTE: Please note that the duration of crediting period of any VPA shall be limited to the end date of the PoA regardless of when the VPA was added.

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	Annual GHG emission reductions (in tonnes of CO₂e) for each year
2011	12855
2012	12855
2013	12855
2014	12855
2015	12855
2016	12855
2017	12855
2018	12855
2019	0
2020	0
Total number of crediting years	10
Annual average GHG emission reductions over the crediting period	10284
Total estimated reductions (tonnes of CO₂e)	102840

A.11. Public funding of the CPA

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No public funding was provided for the implementation of the proposed SSC-VPA.

A.12. Debundling of small-scale component project activities

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Not applicable, As per Gold Standard PoA Rules and Guidance⁶, De-bundling provisions do not apply to this voluntary programme.

A.13. Confirmation for CPA

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The VPA is neither registered as an individual CDM project activity nor is part of another registered PoA.

SECTION B. Environmental analysis**B.1. Analysis of the environmental impacts**

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As described in the PoA-DD, Environmental Impact Analysis is done at PoA level only. Therefore, this section is not applicable. Please refer Part I, Section E of the PoA –DD for details.

SECTION C. Local stakeholder comments**C.1. Solicitation of comments from local stakeholders**

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The stakeholder consultation is provided at the PoA level. Therefore, this section is not applicable. For details, please refer Part I, Section F of the PoA DD.

C.2. Summary of comments received

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The stakeholder consultation is provided at the PoA level. Therefore, this section is not applicable. For details, please refer Part I, Section F of the PoA DD.

C.3. Report on consideration of comments received

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In general, no negative comments have been voiced against this programme and hence, none of the comments required any follow-up action. For details, please refer Part I, Section F of the PoA DD.

SECTION D. Eligibility of CPA and Estimation of emissions reductions**D.1. Title and reference of the approved baseline and monitoring methodology(ies) selected:**

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The proposed VPA applies the small scale methodology AMS I B. “Mechanical Energy for the user with or without Electrical Energy”, (Version 10); under Type I: Renewable energy project activities with a maximum output capacity of 15 MW (or an appropriate equivalent);

D.2. Application of methodology(ies)

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Each VPA complies with the eligibility criteria of the methodology. The same has been justified in the table mentioned below:

<i>Eligibility Criteria</i>	Justification
<i>It comprises of renewable energy technologies that supply individual households or users with a small amount of or groups of households</i>	A TP provides mechanical energy for lifting water. This energy would have otherwise been supplied by a diesel run pump.

⁶ http://www.cdmgoldstandard.org/wp-content/uploads/2011/10/Annex_F_23_Dec_10.pdf



<i>or users with mechanical energy who otherwise would have been supplied with fossil fuel based energy.</i>																					
<p><i>Where generation capacity is specified, it shall be less than 15MW. If the generation capacity is not specified, the estimated diesel-based electricity generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. In the case of irrigation where diesel-fuelled pumps are used directly, the cumulative rating of diesel-fuelled pumps shall not exceed 15 MW.</i></p> <p><i>The size of a diesel-based generator or a diesel pump that would be required shall be justified.</i></p>	<p>The number of TPs in a VPA shall be limited to 15 MW equivalent cumulative rating of diesel-fuelled pumps that would have been used in the absence of VPA.</p> <p>The equivalent capacity of the diesel pump that would be able to provide the same service as the TP shall be used to determine the number of units in a VPA. The same has been calculated as under:</p> <table border="1" data-bbox="603 645 1409 1279"> <thead> <tr> <th colspan="4">Power Rating Treadle Pump</th> </tr> <tr> <th>Description</th> <th>Value</th> <th>Unit</th> <th>Source</th> </tr> </thead> <tbody> <tr> <td>Power Rating of baseline 5 HP Diesel Pump</td> <td>3.7</td> <td>KW</td> <td>Calculated(1 HP = 0.746 KW)</td> </tr> <tr> <td>Quantity of Diesel replaced due to operation of a TP</td> <td>169</td> <td>ml/hr</td> <td>TERI report NO.2006RR 24 (Table 6.4)</td> </tr> <tr> <td>Quantity of Diesel consumed by 5 HP Diesel pumps</td> <td>1174</td> <td>ml/hr</td> <td>IDEI Research and Development (demonstration plot)</td> </tr> </tbody> </table> <p>Power rating of TP = (Quantity of Diesel replaced due to operation of a TP/ Quantity of Diesel consumed by 5 HP Diesel pumps)* Power Rating of 5 HP Diesel Pump</p> <p>Power rating of TP = (169/1174)*3.7</p> <p>Power rating of TP = 533 Watt =0.533 Kilo Watts</p> <p>As per the methodology, if the generation capacity is not specified, the estimated diesel-based electricity generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. Therefore, at any given time, the number of operational TPs included in each VPA is limited to = 15*1000 Kilo Watt/0.533 Kilo Watt =28142</p> <p>Therefore, the size of the VPA shall be limited to a maximum of 28142 operational treadle pumps at any given time.</p>	Power Rating Treadle Pump				Description	Value	Unit	Source	Power Rating of baseline 5 HP Diesel Pump	3.7	KW	Calculated(1 HP = 0.746 KW)	Quantity of Diesel replaced due to operation of a TP	169	ml/hr	TERI report NO.2006RR 24 (Table 6.4)	Quantity of Diesel consumed by 5 HP Diesel pumps	1174	ml/hr	IDEI Research and Development (demonstration plot)
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Quantity of Diesel consumed by 5 HP Diesel pumps	1174	ml/hr	IDEI Research and Development (demonstration plot)																		
<i>For irrigation applications involving replacement of the pump in addition to</i>	<p>TPs are easier to operate and are more efficient than a diesel pump⁷. The technical assessment during the baseline study (refer: TERI Report no.2006RR24 page 3) indicated that the average efficiency of the TPs is</p>																				

⁷ <http://www.jstor.org/pss/4415562>



<p><i>renewable energy use, the operating characteristics (head v/s discharge and efficiency) of the new pump should be similar to or better than the system being replaced or would have been replaced.</i></p> <p><i>In irrigation applications where the water distribution system is replaced or modified, the new system should have distribution efficiency similar to or better than the replaced system.</i></p>	<p>between 15 to 84% and the efficiencies of the diesel pump systems tested in the region ranged from 0.38% to 9.57%.</p> <p>The project activity does not involve replacement or modification of the water distribution system.</p>
<p><i>If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires [non-] renewable biomass and fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</i></p>	<p>The added units (TPs) have only a renewable component and there is no non-renewable component.</p>
<p><i>Project activities adding renewable energy capacity should consider the following cases:</i></p> <p><i>Case1) Adding new units</i></p> <p><i>Case2) Replacing old units for more efficient units</i></p> <p><i>To qualify as a small scale CDM project activity, the aggregate installed capacity after adding the new units (case 1) or installed capacity of the more efficient units (case 2) should be lower than 15 MW.</i></p>	<p>Not applicable, the project is not adding any renewable energy capacity to an existing system.</p>

The proposed small-scale Gold Standard project activity remains, for every year during the crediting period, within the limits of the type I: Renewable energy project activities. The generation capacity of the TPs is not specified. Therefore, as per the paragraph 2 of the methodology, power rating of a treadle pump has been calculated as the estimated diesel-based electricity generating capacity that would be required to provide the same service or mechanical energy; i.e, Power rating of TP is calculated to be

0.533 KW as shown in the calculations above. This translates into a maximum of 28142 operational treadle pumps in the VPA at any given time during the crediting period.

D.3. Sources and GHGs

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Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of fossil fuel for diesel pump	CO ₂	Yes	Major source of emissions.
		CH ₄	No	Not produced.
		N ₂ O	No	Not produced.
Project activity	Use of treadle pump for irrigation	CO ₂	No	No project emissions.

D.4. Description of the baseline scenario

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The simplified baseline for each VPA shall be identified in accordance with Section 7 of the methodology AMS I B, version 10, i.e., the simplified baseline is the estimated emissions due to serving the same load with a diesel generator consumption saved times the emission coefficient for diesel.

D.5. Demonstration of eligibility for a CPA

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The SSC-VPA meets eligibility criteria for inclusion into the SSC – PoA as mentioned in the SSC-PoA-DD. The eligibility criteria are as follows:

- The SSC - VPA involves installation of TPs within the geographical boundary of India.
- Each TP included in the VPA bears a unique identification number to avoid double counting and facilitate unique identification of each TP.
- The SSC-VPA is voluntary in nature and is not mandated by any law/regulation in India. The SSC-VPA does not result in diversion of ODA.
- The SSC-VPA meets the applicability criteria as defined in AMS.I-B, version 10 as described in section D.2 above.
- The SSC-VPA involves installation of renewable energy generation units that supply individual / group of users / households with mechanical energy who otherwise would have been supplied by fossil fuel based energy.
- The size of the VPA is limited to a 15 MW equivalent cumulative rating of diesel/fossil fuel based pumps that would have been used in the absence of VPA, throughout the crediting period of that VPA.
- The SSC-VPA meets the eligibility criteria for demonstration of additionality as mentioned in section B.1 i.e., (i) The SSC-VPA is voluntary in nature and is not prohibited or mandated by law /regulation in India and (ii) the SSC-VPA does not result in diversion of ODA.
- The SSC-VPA has been approved by the coordinating and managing entity for inclusion into the PoA.
- The size of each unit of SSC VPA is not larger than 5% of the small-scale CDM threshold of 15 MW.
- The documentary evidence regarding the start date of the SSC-VPA is provided.
- The SSC-VPA follows sampling in accordance with “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”.

Apart from the above mentioned inclusion criteria, the following criteria also need to be complied with for retroactive VPAs in case a new VPAI implements the VPA.

- Each retroactive SSC VPA implemented by a new VPAI shall justify prior consideration of carbon revenues.⁸

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

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Baseline emissions:

A typical SSC – applies the small scale methodology AMS – I. B “*Mechanical energy for the user with or without electrical energy*” – ver 10. As per para 7 of AMS.I-B, diesel emissions displaced annually may be calculated either as:

(a) *The power requirements times hours of operation per year times the emission factor for diesel generator systems in Table I.D.I under category I.D.*

OR

(b) *The diesel fuel consumption per hour times hours of operation per year times the default value for the emission coefficient for diesel fuel (3.2 kg CO₂ per kg of diesel fuel).*

Each VPA under the PoA shall use Option (b) as defined above for calculation of baseline emissions.

The ex-ante emission reductions of a SSC – VPA are determined using the following set of equations:

$$E_{\text{Baseline, y}} = TP_y * Op * t_y * F_c * \eta_{\text{diesel}} * EF$$

Where,

$E_{\text{Baseline, y}}$	=	Baseline emissions in year y
TP_y	=	Number of TPs in VPA
Op	=	Pump Operation Fraction (% TP in-use)
t_y	=	Average number of hours of operation per TP in year y/quarter i
F_c	=	Diesel saving per TP (liters / hour) (0.169 ltr/hr, from TERI report)
EF	=	Default emissions factor for diesel (3.2 kg CO ₂ / kg of diesel, from AMS I B, version 10)
η_{diesel}	=	Density of diesel (0.82 kg/ltr ⁹)
Y	=	Current operation year (from year 1 to year 10)

For Monitored Data:

Where,

$$Op = TP_{\text{op, N}} / N$$

$TP_{\text{op, N}}$ = Number of TPs found operational from the sampled TPs

N = Number of TPs sampled in year y/quarter i

$$t_y = \left(\sum_{i=1, j=1}^{i=4, j=N} (D_{i,j} * h_{i,j}) \right) / N$$

t_y = Average number of hours of operation per TP in year y/ quarter i

⁸ As VPA are based on time, multiple VPAs may be implemented by same VPAI. In this case prior consideration of CDM shall be considered at the time of start of treadle pump distribution programme rather than on individual VPA level. Therefore, the aforesaid criteria shall be checked for retroactive VPAs of each new VPAI in the PoA.

⁹ <http://www.siamindia.com/scripts/Diesel.aspx>

D	=	Average days of usage of TP in quarter i
H	=	Hours of usage per day of TP in quarter i
N	=	Total number of TPs sampled in year y/quarter i
i	=	Number of quarters in an year y
j	=	Number of TPs monitored in an year y/ quarter i

Project Emissions ($E_{\text{project},y}$):

Not Applicable as per methodology.

Leakage ($E_{\text{Leakage},y}$):

No leakage has been identified. The TPs installed in the VPA would be new and would not be transferred from another activity.

Emission Reductions (ER_y):

$$ER_y = E_{\text{baseline}} - E_{\text{leakage}} - E_{\text{project}}$$

$$ER_y = E_{\text{baseline}} - 0 - 0$$

Therefore,

$$ER = E_{\text{baseline}}$$

D.6.2. Data and parameters that are to be reported ex-ante

Data / Parameter:	Fc
Unit	Litre/hour
Description	Diesel saving per treadle pump
Source of data	TERI Report No. 2006RR24 Table 6.4, Page 39
Value(s) applied	0.169
Choice of data or Measurement methods and procedures	In line with field observations and secondary data available, The TERI report does not consider diesel pump sets below 1% efficiency in the diesel savings calculation. This would ensure that credit is not taken for substituting highly inefficient diesel pump sets and the carbon saving calculation is thus conservative.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter:	η_{diesel}
Unit	kg diesel/ltr diesel
Description	Density of diesel
Source of data	Society of Indian Automobile Manufacturers
Value(s) applied	0.82
Choice of data or measurement methods and procedures	http://www.siamindia.com/scripts/Diesel.aspx
Purpose of data	Calculation of baseline emissions
Additional comment	

D.6.3. Ex-ante calculation of emission reductions

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The ex-ante emission reductions of a SSC – VPA are determined using the following set of equations:

$$E_{\text{Baseline}, y} = TP_y * Op * t_y * F_c * \eta_{\text{diesel}} * EF$$

Where,

$E_{\text{Baseline}, y}$	=	12855
TP_y	=	28035
Op	=	100
t_y	=	1034
F_c	=	0.169 ltr/hr
EF	=	3.2 kg CO ₂ / kg of diesel
η_{diesel}	=	0.82 kg/ltr ¹⁰

i.e.

$E_{\text{Baseline}, y}$	=	TP_y	*	Op	*	t_y	*	F_c	*	η_{diesel}	*	EF
	=	28035	*	100%	*	1034	*	0.169	*	0.82	*	3.2

$$E_{\text{Baseline}} = 12855 \text{ tCO}_2$$

$$t_y = \left(\sum_{I=1, j=1}^{i=4, j=N} (D_{i,j} * h_{i,j}) \right) / N$$

t_y	=	1034 hours
D	=	184
h	=	5.62

$$t_y = 184 * 5.62$$

$$t_y = 1034$$

Project Emissions ($E_{\text{project}, y}$):

Not Applicable as per methodology. Therefore, $E_{\text{project}, y} = 0$.

Leakage ($E_{\text{Leakage}, y}$):

No leakage has been identified. The TPs installed in the VPA are new and are not transferred from another activity. Therefore, $E_{\text{Leakage}, y} = 0$.

Emission Reductions (ER_y):

¹⁰ <http://www.siamindia.com/scripts/Diesel.aspx>

$$ER_y = E_{\text{baseline}} - E_{\text{leakage}} - E_{\text{project}}$$

$$ER_y = 12855 - 0 - 0$$

Therefore,

$$ER = 12855 \text{ tCO}_2$$

D.6.4. Summary of the ex-ante estimates of emission reduction

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
2011	12855	0	0	12855
2012	12855	0	0	12855
2013	12855	0	0	12855
2014	12855	0	0	12855
2015	12855	0	0	12855
2016	12855	0	0	12855
2017	12855	0	0	12855
2018	12855	0	0	12855
2019	0	0	0	0
2020	0	0	0	0
Total	102840	0	0	102840
Total number of crediting years	10			
Annual average over the crediting period				10284

D.7. Application of the monitoring methodology and description of the monitoring plan

D.7.1. Data and parameters to be monitored

Data / Parameter:	TP_y
Unit	Number
Description	Number of TPs in the VPA
Source of data	Sales records
Value(s) applied	28035
Measurement methods and procedures	Warranty cards shall be used to compile sales records of TPs installed under the VPA.
Monitoring frequency	Monitored continuously, recorded Quarterly/Annually
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter:	N
Unit	Number
Description	Number of TPs sampled in an year y /Quarter i
Source of data	Monitoring survey report
Value(s) applied	31
Measurement methods and procedures	Please refer sampling plan as mentioned the section D.7.2



Monitoring frequency	Annually or quarterly
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	This would be done according to the sampling plan.

Data / Parameter:	TP_{op, N}
Unit	Number
Description	Number of TPs found operational from the sampled TPs
Source of data	Monitoring survey report
Value(s) applied	31
Measurement methods and procedures	Please refer sampling plan as mentioned in section D.7.2.
Monitoring frequency	Annually or quarterly
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	This would be done according to the sampling plan.

Data / Parameter:	t_y
Unit	Average number of hours of operation per TP in year <i>y</i> / <i>quarter i</i>
Description	The same shall be calculated by hours and average days of usage of TP in a quarter/year
Source of data	Monitoring survey report
Value(s) applied	1034
Measurement methods and procedures	Please refer sampling plan as mentioned in Section D.7.2.
Monitoring frequency	Annually or quarterly
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	This would be done according to the sampling plan.

Data / Parameter:	H
Unit	Hours
Description	Average hours of usage per day of TP in a quarter <i>i</i> /year <i>y</i>
Source of data	Monitoring survey report
Value(s) applied	5.62
Measurement methods and procedures	Please refer sampling plan as mentioned in Section D.7.2.
Monitoring frequency	Annually or quarterly
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	A sample survey shall be conducted for the same with the help of trained personnel. In case where survey results indicate that desired precision is not achieved, the lower bound of confidence interval of the parameter value would be used.

Data / Parameter:	D
Unit	Days

Description	Average days of usage of TP in a quarter i /year y
Source of data	Monitoring survey report
Value(s) applied	184
Measurement methods and procedures	Please refer sampling plan as mentioned in Section D.7.2.
Monitoring frequency	Annually or quarterly
QA/QC procedures	Training provided to field staff for data collection. Revisits by senior staff to cross check and validate the data collection.
Purpose of data	Calculation of baseline emissions
Additional comment	A sample survey shall be conducted for the same with the help of trained personnel. In case where survey results indicate that desired precision is not achieved, the lower bound of confidence interval of the parameter value would be used.

Sustainability parameters:

Data / Parameter	Work years created through IDEI
Unit	Quantitative
Description	Number of work years created through IDEI
Source of data	Employment and other record of IDEI
Value(s) applied	Number of work years created through IDEI
Measurement methods and procedures	Will be measured by referring to employment and other records of IDEI.
Monitoring frequency	Quarterly/Annually
QA/QC procedures to be applied:	All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later.
Purpose of data	Monitoring of sustainable development benefits achieved by the project activity.
Additional comments	

Data / Parameter	Access to affordable and clean energy services
Unit	Number
Description	Number of TPs sold
Source of data	Sales records
Value(s) applied	28035 (for sample VPA calculations in Part II, Section B.6.3. only)
Measurement methods and procedures	Warranty cards shall be used to compile sales records of TPs installed.
Monitoring frequency	Quarterly/Annually
QA/QC procedures to be applied:	All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later.
Purpose of data	Monitoring of sustainable development benefits achieved by the project activity.
Additional comments	

D.7.2. Description of the monitoring plan

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Sampling Procedure:

The sampling is done in accordance with “Standard for Sampling and Surveys for CDM project activities and Programme of Activities”. The sampling procedure/method used for monitoring shall be as follows:

(a) Sampling Design:

(i) *Objective and Reliability Requirements:* The objective of sampling is to monitor the following parameters:

- a. No of pumps operational out of all the pumps surveyed
- b. Hours of operation in quarter i
- c. Days of operation in quarter i

The above parameters shall be monitored using a 90/10 (confidence/precision) (or, 95/10 as the case may be), as per the frequency described above. On a quarterly basis, 25% of the samples shall be monitored to cover 100% samples over a year.

(ii) *Target Population:* The target population is the TP users under the programme

(iii) *Sampling Method:* The sampling method chosen is simple random sampling.

Sample Size: The sample size shall be calculated for 90/10 (confidence/precision) or, 95/10 as the case may be. Sample size shall be determined either using available online sample size calculators (for example: <http://www.raosoft.com/samplesize.html>) or standard statistical formulae as follows:

$$n \geq \frac{z^2 \times N \times V}{(N - 1) \times \text{precision}^2 + z^2 \times V}$$

WHERE,

n = Number of treadle pumps to be sampled

N = Total number of treadle pumps in the population

p = Proportion

z = Constant referring to level of confidence (e.g. 1.645 for 90 % and 1.96 for 95 % confidence)

precision = Required precision (e.g. 10% = 0.1)

$$V = \frac{p \times (1 - p)}{p^2}$$

For proportion based parameters and ;

$$V = \left(\frac{SD}{\text{mean}} \right)^2$$

For mean based parameters

(iv) *Sampling Frame:* TP sales Records

(b) Data:

(i) *Field Measurements:* Field measurements for different parameters are conducted using the following monitoring procedures:



Parameter	Description of measurement methods and procedures to be applied:
No of pumps operational out of all the pumps surveyed	Survey
Hours of operation in quarter i	Survey
Days of operation in quarter i	Survey

The frequency of monitoring is annual or quarterly.

(ii) *Quality Assurance/ Quality Control:* The evidence of training of staff would be documented. In case where survey results indicate that desired precision is not achieved, the lower bound of corresponding confidence interval of the parameter value would be used as an alternative to repeating survey.

(iii) *Analysis:* The data derived using monitoring shall be used to estimate the actual amount of ERs accrued by the project.

(c) Implementation Plan:

The staff assigned the task of survey would be provided adequate training. The evidence of training will be documented.



SECTION E. Approval and authorization

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The parties involved in the PoA do not wish to be involved in the PoA. This section is not applicable for this voluntary Gold Standard project.

**Appendix 1: Contact information on entity/individual responsible for the CPA**

Organization:	International Development Enterprises (India)
Street/P.O.Box:	Sector 12, Dwarka
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Represented by:	Amitabha Sadangi
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**Appendix 2: Affirmation regarding public funding**

Not applicable, as no public funding has been provided.

Appendix 3: Applicability of the selected methodology(ies)

Please refer Section D.2 of the VPA-DD.

Appendix 4: Further background information on ex ante calculation of emission reductions

Please refer section D.6.3 of the VPA-DD.

Appendix 5: Further background information on monitoring plan

Please refer Section D.7.2 of the VPA-DD

History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities" (EB 66, Annex 17).
01	EB33, Annex44 27 July 2007	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration		