

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

Key Project Information

0 - Description of project

0 - Implementation of project

0 - Description of monitoring system applied by the project

0 - Data and parameters

0 - Calculation of SDG Impacts

0 - Safeguards Reporting

0 - Stakeholder inputs and legal disputes

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KEY PROJECT INFORMATION

Programme of Activity Information – (delete below table if N/A)

GS ID of Programme	GS11009
Title of Programme	TASC Clean Cooking PoA
Version of POA-DD applicable to this monitoring report	5.0
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS11604 - VPA 4 (Zambia)

Key Project Information

GS ID (s) of Project (s)	GS11604
Title of the project (s) covered by monitoring report	TASC Clean Cooking PoA – VPA 4 (Zambia)
Version number of the PDD/VPA-DD(s) applicable to this monitoring report	5.0
Version number of the monitoring report	1.6
Completion date of the monitoring report	11/03/2025
Date of project design certification	21/10/2022
Date of Last Annual Report	n/a
Monitoring period number	2
Duration of this monitoring period	MP2: 16/04/2023-19/06/2024 (Inclusive)
Project Representative	The African Stove Company Ltd. (TASC)
Host Country	Zambia
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Targeted	SDG Impact Goals	Amount Achieved	Units/ Products
1 No Poverty	Average amount of money saved due to a reduction in fuel costs	132	Zambian Kwacha
1 No Poverty	Number of ICS distributed	1,098	ICS
3 Good Health and Well-Being	Households reporting reduction in smoke/ PM emissions while cooking on project ICS	100%	Households
5 Gender Equality	Female households reporting time saving from fuel collection & cooking time	99%	Households
7 Affordable and Clean Energy	ICS installed that are in operation	1,098	ICS
8 Decent Work and Economic Growth	Number of person (male and female) hired under Project	18	Contracted Staff
12 Responsible Consumption and Production	Charcoal fuel saving while cooking on project ICS	1.9439	Tonnes per stove per annum
13 Climate Action	Net emission reductions of CO ₂ for the monitoring period	5,902	tCO ₂ e

Table 2 – Product Vintages

MP2		Amount Achieved
Start Dates	End Dates	VERs
16/04/2023	31/12/2023	3,409
01/01/2024	19/06/2024	2,493

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

The goal of the proposed project is to distribute improved cookstoves (ICS) in households in Zambia.

The African Stove Company Ltd. (TASC)¹ is the coordinating/managing entity (CME) of the PoA and is the sole implementer of the VPA. TASC's mission is financing and developing high-impact climate mitigation projects.

At the time of monitoring, 1,098 stoves were present in the database for VPA4. The VPA is therefore retroactive in nature, as the first ICS was distributed in Zambia on 16/04/2021.

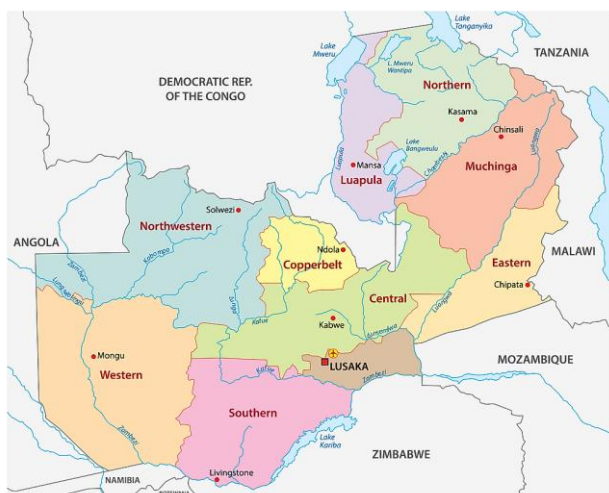
The project ICS combust biomass fuels more efficiently, reducing the greenhouse gas (GHG) emissions and particulate emissions (PM), thus improving the indoor air quality in project households. Due to the higher thermal efficiency of the ICS relative to the traditional/baseline stoves, the ICS reduces the amount of non-renewable biomass fuel required for meeting similar thermal energy needs.

In the absence of the VPA, inefficient, traditional charcoal braziers would have been used for cooking. Replacing these with project ICS reduces non-renewable biomass fuel consumption and corresponding GHG emissions.

A.2. Location of project

Host Country: Zambia

¹ <https://tasc.je/>



Zambia map and provinces

The VPA is implemented across Zambia and not limited to any specific provinces. The GPS coordinates of Zambia are – 13.1339 S, 27.8493 E.

The TASC headquarters is located at:

Warehouse G1, Mungwi Centre,
Plot 7403 Mungwe Road, Light Industrial Area,
Lusaka, Zambia

A.3. Reference of applied methodology

Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1

A.4. Crediting period of project

Start and end date of crediting period:

16/04/2021 – 15/04/2026 (inclusive)

Total length of crediting period:

15 years (5 years, twice renewable)

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

The goal of the proposed project is to distribute improved cookstoves (ICS) to households in Zambia.

The African Stove Company Ltd. (TASC)² is the coordinating/managing entity (CME) of the PoA and is the sole implementer of the VPA. TASC's mission is financing and developing high-impact climate mitigation projects.

The Voluntary Project Activity (VPA) "TASC Clean Cooking PoA – VPA 4 (Zambia)" has been implemented within the project boundary in line with the approved VPA design. The VPA distributed ICS technologies which are based on the principle of improving heat transfer from combustion chamber to cooking pot, saving cooking/fuel collection time. The ICS design optimizes the combustion chamber shape, fuel amount, and air flow through the stove. To maximize thermal energy, the thermal mass of the ICS is reduced minimizing heat loss through the sides and bottom of the stove and the cooking surface is positioned at the optimal distance from the fire. This is essential to establishing a correct gas flow path needed for efficient heat transfer.

The clearance between the grate and the floor provides for natural draft of air into the combustion chamber resulting in improved combustion as compared to traditional cook stoves where such natural draft is absent resulting in incomplete combustion of fuel. The combustion chamber may also have a refractory lining that reduces heat loss from the walls of the stove.

This VPA has commenced the distribution of the Jikokoa charcoal stove. The Jikokoa is manufactured by Burn Manufacturing LLC and delivers a thermal efficiency of 53.7% which was obtained through third party testing by KIRDI in 2020.

² <https://tasc.je/>



Burn Jikokoa model cookstove

Funding for this project was supplied by the private sector and no public finance from any Annex 1 party is involved.

Distribution started on 16/04/2021 when the first ICS's were distributed to families within Zambia.

Date	Activity
16/04/2021	Project start date (Start of stove distribution)
16/04/2021	Start of project crediting period
20/05/2022-21/05/2022	1 st Project Habit Survey
16/05/2022-19/05/2022	1 st Project KPT Survey
12/06/2023 - 15/06/2023	2 nd Project Habit Survey
28/05/2024 – 31/05/2024	2 nd Project KPT Survey (MP2)
03/06/2024 – 05/06/2024	3 rd project Habit Survey (MP2)

B.1.1 Forward Action Requests

FAR1: In the registered VPA DD, the baseline scenario is identified as the households using charcoal for day to day cooking purpose. However during the onsite survey, VVB has observed that the following household were using the higher efficient cookstoves such as Electric stove and LPG in the baseline scenario.

- 148617766 (Peter Munenga)
- 148569563 (Christon Sinkala)

Therefore PP is requested to remove these households from the database in upcoming monitoring periods.

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During the onsite visit and interviews, VVB has observed that the following stoves were damaged beyond repairs and as notified by the households, the stoves were neither repaired nor replaced.:

- 148581172 (Mercy Kapata)
- 148569563 (Christon Sinkala)
- 148643312 (Diana Chibwe)

Therefore PP is requested to remove these household from the database in upcoming monitoring periods

Stove serial numbers 148617766 (Peter Munenga) and 148569563 (Christon Sinkala):

The baseline scenario was assessed at validation prior to the project implementation, and it is not the baseline scenario that is being assessed in this verification. Solwezi is a peri-urban area and many of the households do have access to electricity/LPG and may own an electric/LPG stove, however, this does not mean that they are using an electric/LPG stove as their primary stove. Many do not use it at all as electricity and LPG are expensive. The primary stove captured in the baseline scenario for the VPA was a charcoal brazier (traditional stove) and the primary fuel type was charcoal – this scenario was assessed, validated and certified at the VPA inclusion stage. In an improved cookstove project the baseline scenario is compared with the project scenario (for each MP) and emission reductions are based on the reduction in fuel being used. This is also why KPTs are the most accurate way of monitoring this parameter value, because they isolate fuel use in the household (i.e. only charcoal use), so that there is a clear like-for-like comparison between the baseline device and the project device using the same fuel; any other fuel use is not captured as it is not relevant to the project as the project only places focus on the reduction of charcoal being used, not electricity or LPG. However, in accordance with this FAR, these stoves will be excluded from the database for future monitoring periods.

Stove serial number 148569563 (Christon Sinkala): This household, discovered to have a damaged stove, participated in a habit survey during May 2022 (for MP1), where they reported the stove as intact and in daily use. During the verification site visit in September 2023, the household disclosed that the stove had sustained damage within the last approximately three months, which was not captured in the May 2022 surveys. To facilitate reporting of stove damage, all households received leaflets with TASC contact details upon receiving their stoves.

Stove serial numbers 148643312 (Diana Chibwe) and 148581172 (Mercy Kapata): These stoves were reported as damaged within the two months preceding the site visit in September 2023. Despite this, they were found to be operational during the monitoring period, as confirmed by the habit survey.

However, now that the damage has been identified, all three of these stoves will be excluded from the database for future monitoring periods.

B.2. Post-Design Certification changes

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

n/a

B.2.2. Corrections

The non-CO₂ emission factors previously used in the PDD were from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.9 - Residential Source Emission Factors (275 – 386 kg/TJ for CH₄ and 1.6 – 9.3 kg/TJ for N₂O). However, during performance review for the first monitoring period of this VPA it was recommended that these values be changed to reflect the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5 - Default Emission Factors for Stationary Combustion In The Residential and Agriculture/Forestry/Fishing/Fishing Farms Categories (200 kg/TJ for CH₄ and 1 kg/TJ for N₂O). These changes have been retained for this monitoring period.

B.2.3. Changes to start date of crediting period

n/a

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

n/a

B.2.5. Changes to project design of approved project

n/a

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

Two different monitoring methods were applied to the VPA during this monitoring period: the first being qualitative user habit surveys (i.e., project survey and usage survey) and the second being quantitative kitchen performance tests (KPT's). Both

these monitoring activities were done in the field using trained data capturers (DC's) during the period 28/05/2024-05/06/2024.

Habit Surveys

User habit surveys were carried out by using a pre-created webform on the SurveyCTO application on DC's phones. Samples were drawn at random from the monitoring database by using an MS Excel randomizer programme and the first households in each random list were selected for sampling (either for surveys or KPTs). Each DC visited the randomly sampled households from the Monitoring Database and surveyed the stove user filling in the web-based form on an application on the DC's phone. The results were uploaded directly to TASC's cloud-based monitoring database and could then be exported in to a excel spreadsheet for analysis.

This survey captured basic social, economic, and cooking habit information from the participants. Information captured included: name, NRC (National Registration Card) number, contact phone number, device serial number and location (i.e., region, village and GPS coordinates). Further information in these habit surveys included stove usage habits, reduction in smoke/charcoal consumption/time cooking/time buying charcoal and other relevant information on the characteristics of the kitchen to check if there are any changes that may impact the emission reductions e.g., stove stacking, and other relevant information as per the VPA-DD Monitoring Plan.

Kitchen Performance Tests (KPTs)

KPT's were carried out on a random sample of project households according to the KPT Version 4.0 document³. The KPT's were implemented in the monitoring period to determine the average charcoal use per household per annum with the ICS. KPT's were carried out at randomly sampled households from the Monitoring Database and consisted of tests being done on 4 consecutive days at each household at approximately the same time each day. At the start of the KPT, an amount of charcoal fuel that was estimated to be required for the next 4 days of usage was weighed and set aside as a Control Pile. Family members were then instructed to only use charcoal from this Control

³ <https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf>

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Pile during the KPT and to maintain their normal cooking/heating practices to ensure the usage rate of charcoal during the KPT's was best representative. DC's then visited the same households at roughly the same time on each of the 4 days in order to weigh the charcoal left in the Control Pile, or to check and weigh any additional charcoal that needed to be added, and measure the moisture content of randomly selected charcoal pieces. For each visit, the number of people that ate their meals in the household since the DC's last visit was recorded as this number can vary from one day to the next. Also, the age and gender of all persons in the household were recorded. At the end of the KPT the final weight of the remaining charcoal in the Control Pile was recorded.

Data was captured using the SurveyCTO application on the DC's phone with a specific webform created for the KPT data. The results were uploaded directly to TASC's cloud-based monitoring database and could then be exported in to a excel spreadsheet for analysis.

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

SDG13

Data/parameter	$B_{b,y}$
Unit	Tonnes per household per annum
Description	Quantity of fuel consumed in baseline scenario b during year y , in tonnes
Source of data	Baseline kitchen performance tests (KPTs)
Value(s) applied	2.5630 tonnes
Choice of data or Measurement methods and procedures	KPT Version 4.0 ⁴
Purpose of data	Calculation of baseline scenario
Additional comment	See Section E below

SDG 13

Data/parameter	EF_{b,i,CO_2}
Unit	tCO_2/t_{fuel}
Description	CO_2 emission factor arising from use of fuel type i in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5 - Default emission factors for stationary combustion in the residential and agriculture/forestry/fishing/fishing farms categories
Value(s) applied	Fuel: $3.304 tCO_2/t_{fuel}$
Choice of data or Measurement methods and procedures	Mean value of the range of default IPCC values has been applied
Purpose of data	Calculation of baseline scenario
Additional comment	-

⁴ <https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf>

SDG 13

Data/parameter	EF _{b,i,nonCO2}
Unit	tCO ₂ /t _{fuel}
Description	Non-CO ₂ emission factor arising from use of fuel type <i>i</i> in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.9 - Residential Source Emission Factors
Value(s) applied	Fuel: 0.173 tCO ₂ /t _{fuel}
Choice of data or Measurement methods and procedures	Mean value of the range of default IPCC values has been applied
Purpose of data	Calculation of baseline scenario
Additional comment	-

SDG 13

Data/parameter	EF _{p,i,CO2}
Unit	tCO ₂ /t _{fuel}
Description	CO ₂ emission factor arising from use of fuel type <i>i</i> in project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5 - Default emission factors for stationary combustion in the residential and agriculture/forestry/fishing/fishing farms categories
Value(s) applied	Fuel: 3.304 tCO ₂ /t _{fuel}
Choice of data or Measurement methods and procedures	Mean value of the range of default IPCC values has been applied
Purpose of data	Calculation of baseline scenario
Additional comment	-

SDG 13

Data/parameter	EF _{p,i,nonCO2}
Unit	tCO ₂ /t _{fuel}
Description	Non-CO ₂ emission factor arising from use of fuel type <i>i</i> used in project scenario

TEMPLATE- Monitoring Report

Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.9 - Residential Source Emission Factors
Value(s) applied	Fuel: $0.173 \text{ tCO}_2/\text{t}_{\text{fuel}}$
Choice of data or Measurement methods and procedures	Mean value of the range of default IPCC values has been applied
Purpose of data	Calculation of baseline scenario
Additional comment	-

SDG 13

Data/parameter	$\text{NCV}_{b,i}$
Unit	TJ/tonne
Description	Net calorific value of the fuel type i used in the baseline
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1: Introduction, Table 1.2 - Default net calorific values
Value(s) applied	Fuel: 0.0295 TJ/tonnes
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	Calculation of baseline scenario
Additional comment	-

SDG 13

Data/parameter	$\text{NCV}_{p,i}$
Unit	TJ/tonne
Description	Net calorific value of the fuel type i used in the project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1: Introduction, Table 1.2 - Default net calorific values
Value(s) applied	Fuel: 0.0295 TJ/tonnes
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	Calculation of baseline scenario
Additional comment	If EF is in units of $\text{tCO}_2/\text{t}_{\text{fuel}}$, remove NCV term from emission calculations.

SDG 13

Data/parameter	$f_{NRB,b,i,y}$
Unit	Fraction
Description	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
Source of data	From C4 EcoSolutions study; dated 11/03/2022
Value(s) applied	Fuel: 0.91 Renewable solid biomass fuels (Crop residues / cow dung): 0.0000 Fossil fuels: 1
Choice of data or Measurement methods and procedures	N.A.
Purpose of data	Calculation of baseline scenario
Additional comment	Value once established in the first VPA of a country may be used for subsequent VPAs in that country

D.2 Data and parameters monitored

SDG 13

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Data / Parameter	$B_{p,y,i}$
Unit	Tonnes per household per annum
Description	Quantity of fuel consumed in project scenario p during year y, in tonnes, and as derived from the statistical analysis conducted on the data collected during the project performance field tests
Source of data	Field performance Tests (FPTs)
Value(s) applied	0.6190
Measurement methods and procedures	KPT Version 4.0 ⁵
Monitoring frequency	Updated every two years
QA/QC procedures	Three 100kg MNCS scales, two 200kg Crane scales and one 50kg Salter scale were used. The 100kg scales were newly purchased on 18/05/2024 while the 200kg and 50kg scales were calibrated on 05/03/2024. 2 in 1 mm-210 moisture meters were newly purchased from Ryobi on 06/03/2024. The moisture meters can measure moistures between 5 – 50 % and has an error margin of $\pm\%$. The scales can weigh between 0.5 – 200kg in 0.05kg intervals.
Purpose of data	For emission reduction calculations
Additional comment	A 'Case of a Single Sample Test' shall be applied with a minimum sample size of 20 and the '90/10 rule' or '90% confidence rule' applied. KPT protocol shall be used for PFT (for e.g.: PCIA KPT protocol may be used)

Data / Parameter	$U_{p,y}$
Unit	Fraction (or %)
Description	Usage rate in project scenario p during year y determined on a sampling basis
Source of data	Annual usage survey
Value(s) applied	79%

⁵ <https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf>

TEMPLATE- Monitoring Report

Measurement methods and procedures	Sampling surveys (telephonic / physical) may be conducted to record the continued operation of project devices. The usage rate shall be calculated for each age (simple random / stratified random sampling to be applied as applicable)
Monitoring frequency	Annual
QA/QC procedures	CME provided guidance and training to enumerators to conduct surveys which met the specific requirements of the methodology.
Purpose of data	For emission reduction calculations
Additional comment	The monitored usage rate as per the user habit surveys is 79%. This was obtained through the implementation of 'Good Practice' monitoring under the VPA. The VPA implementer has conducted field team training and supervision, end-user training and follow-ups and an awareness campaign. The VPA implementer conducts community sensitization meetings and has a permanent, full-time dedicated monitoring team employed on the project for this purpose.

Data / Parameter	$N_{p,y}$
Unit	number
Description	Technologies in the Monitoring Database for project scenario p through year y
Source of data	Monitoring Database
Value(s) applied	1,098
Measurement methods and procedures	Number of stoves listed in the Monitoring Database
Monitoring frequency	Continuous
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	For emission reduction calculations
Additional comment	ICS included in the VPA will be registered in the monitoring database via the data collection app

Data / Parameter	$LE_{p,y}$
Unit	Tonnes of CO ₂ equivalent per year
Description	Leakage in project scenario p during year y
Source of data	Leakage assessment

TEMPLATE- Monitoring Report

Value(s) applied	0
Measurement methods and procedures	Qualitative / quantitative assessment
Monitoring frequency	Aggregate leakage can be assessed for multiple project scenarios, if appropriate, every two years
QA/QC procedures	N.A.
Purpose of data	For leakage emissions
Additional comment	See Section E.3 for justification

SDG 1

Data / Parameter	BSA / HHS
Unit	Number
Description	Proportion of population living in households with access to basic services
Source of data	1. Monitoring Database ICS distribution records 2. Ex-post Monitoring Survey Records
Value(s) applied	1,098 ICS in use
Measurement methods and procedures	1. Records of number of VPA ICS distributed in Monitoring Database 2. Ex-post monitoring survey to assess the proportion of population with ICS still in operation
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 1 contribution
Additional comment	-

SDG 3

Data / Parameter	SPM _{HH}
Unit	%
Description	Air Quality in project households
Source of data	Ex-post monitoring survey records
Value(s) applied	100
Measurement methods and procedures	Ex-post monitoring survey assessing on a sampled basis the percentage of VPA households reporting reduction in smoke/PM emissions/indoor air pollution while cooking on the project ICS vs. baseline
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 3 contribution

TEMPLATE- Monitoring Report

Additional comment	-
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SDG 5

Data / Parameter	HHTS
Unit	%
Description	Time saving per household
Source of data	Ex-post Monitoring Survey Records
Value(s) applied	99
Measurement methods and procedures	Ex-post monitoring survey assessing on a sampled basis the percentage of VPA households reporting time saved while cooking on the project ICS vs. baseline.
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	SDG 5 contribution
Additional comment	-

SDG 7

Data / Parameter	AACS _{HH}
Unit	Number
Description	Number of households and institutions having access to affordable, reliable and modern energy services.
Source of data	ICS Monitoring Database
Value(s) applied	1,098 ICS
Measurement methods and procedures	Monitoring the number of ICS distributed under the project as an indicator of providing affordable, reliable and modern energy services.
Monitoring frequency	Continuous
QA/QC procedures	-
Purpose of data	SDG 7 contribution
Additional comment	-

SDG 8

Data / Parameter	QE IG
Unit	Number
Description	Quantitative Employment and income generation
Source of data	Employment records
Value(s) applied	18

TEMPLATE- Monitoring Report

Measurement methods and procedures	Recording the number of employees (male / female) in the VPA for ICS distribution, logistics, monitoring & management
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 8 contribution
Additional comment	-

SDG 12

Data / Parameter	$B_{y,savings}$
Unit	Tonnes/year
Description	Reduction in domestic fuel consumption
Source of data	Ex-post monitoring survey records
Value(s) applied	1.9439
Measurement methods and procedures	Ex-post monitoring ($B_{p,y,i}$) via KPTs to determine fuel savings
Monitoring frequency	Annually / biennially
QA/QC procedures	-
Purpose of data	SDG 12 contribution
Additional comment	This value is indicative and will be updated prior to first issuance.

D.3. Comparison of monitored parameters with last monitoring period

Monitored parameter	MP1		MP2
	HS1	HS2	
$B_{p,y,i}$	0.7773 t	0.7773 t	0.6190 t
$U_{p,y}$	75%	75%	79%
$LE_{p,y}$	0 tCO ₂	0 tCO ₂	0 tCO ₂
$N_{p,y}$	1,100	1,100	1,098
BSA / HHS	1,100	1,100	1,098
SPM _{HH}	99%	100%	100%
HHTS	100%	100%	99%
AACS _{HH}	1,127	1,100	1,098
QE IG	15	14	18
$B_{y,savings}$	1.7889 t	1.7857t	1.9439 t

D.4. Implementation of sampling plan

All monitored parameters were assessed by using simple random sampling, at the required precision/confidence level. Usage habit surveys were conducted to establish usage and changes in conditions experienced since the implementation of the ICS project. The sample size was done according to the TPDDTEC Version 3.1 document, here it states that for a group size > 1000 a minimum sample size of 100 is needed for such a survey. Samples were selected on a random basis from the Monitoring Database using MS Excel's random selection formula. The habit surveys for this MP were conducted on 119 randomly selected households spread throughout the project distribution areas to prevent bias to a certain region. An additional 19 samples above the minimum 100 were selected to practice oversampling in case households cannot be contacted for surveys or if data collection errors were discovered.

User Habit Surveys:

The project habit surveys for this MP were completed from 03/06/2024 to 05/06/2024. Of the 119 survey respondents, 12 no longer had possession of their stove. The following calculations have been done using the remaining 107 respondents and are presented as percentages of recipients who still have their stove. The missing/damaged stoves are accounted for in our ER calculations. To do this, the percentage of missing/damaged stoves in the habit surveys was calculated to be 10% and so a 10% discount was applied to the technology days calculated for this monitoring period. The calculations for this can be seen in section E.1.

100% of participants with a stove indicated a reduction of smoke since implementation of the ICS, 99% of participants also indicated that they had more time since the ICS significantly reduced time sourcing charcoal and cooking. From the survey 100% of respondents reported saving money from the use of the ICS, the average amount saved was calculated as ZK 132.33 (Zambian kwacha) per month.

Households are typically made up out of the following demographics:

- 2.5 Children under the age of 14
- 2.1 Females older than 14
- 1.6 Males aged 15 – 59
- 0.0 Males aged 60 and older

TEMPLATE- Monitoring Report

Cooking predominantly was done outside with 42% of households reporting this habit. 50% of households reported cooking took place both inside and outside and 8% of households cook inside.

The majority of households with stoves indicated that they use their stove with 80% using it every day, 11% using it several times a week, 3% using it once a week and 6% not using it at all.

28% of users reported that they were still using other stoves/devices in addition to the ICS and most of these users. Other stoves used were charcoal braziers (10.3%), electrical stoves (9.3%) and gas stoves (9.3%). Most of the respondents (96%) stated that cleaning ashes from the stoves were part of the maintenance and 73% cleaned the flue as well. All stove owners maintained their stoves with 89% of users performing maintenance daily and 11% of users did maintenance weekly.

Females are primarily responsible for getting the charcoal with 65% and the average age is 36 years old. Cooking time is reported to be drastically reduced with the addition of the ICS, 99% of households indicated a reduction in cooking time and 100% of all households using an ICS reported a reduction in smoke. Suggestions were made to improve the hardness of the stove so that it can last longer and to provide larger, two plate stoves. Some beneficiaries said they would have preferred a grey or black stove to the current colour.

Project Kitchen Performance Tests (KPTs)

The KPTs for this monitoring period were conducted between 28/05/2024 to 31/05/2024 within the required frequency of biennial monitoring of the parameter Bp,y,i.

For determining the fuel consumption in the project scenario, the KPT sample size determination was based on the guidance given in the TPDDTEC Version 3.1 methodology. A Single-Sample KPT was used with 90/10 precision giving a sample size of 56, after the 56 KPT's were completed a precision value of 7.31% was achieved.

From the MRV2 KPT's it was established that project households used on average 1.7kg of charcoal fuel per day, this added up to an average annual household charcoal

consumption of 0.619 tonnes, which is a saving of 1.9439 tonnes compared to the baseline.

Usage Rate Monitoring

For Good Practice usage rate (up to 90%), it is required to do field team training, End-User training, follow-ups and do an awareness campaign. Before distribution in each village/area sensitization meetings are held to explain how the stove works and together with stove distribution each participant receives a how to guide. The VPAI also has a call center which does follow up calls with stove recipients on their experiences with the stoves, gathering usage data. Together with this, the field team does ongoing monitoring activities in the field to ensure data quality is up to standard and this also helps to encourage users of the stoves to use the stoves and provides them with chance to raise queries on the stoves and project.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

SDG 13: Climate Action

$BE_{b,y}$ Baseline emissions for baseline scenario b in year y (tCO₂e/yr)
= 7,783

$$BE_{b,y} = \sum_{b,p} N_{p,y} * U_{p,y} * (ER_{b,y,CO_2} + ER_{y,nonCO_2}) - \sum LE_{p,y}$$

Where:

$\sum_{b,p}$ Sum over all relevant (baseline b) couples
= 1,098 ICS

$N_{p,y}$ Cumulative number of project technology-days included in the sales/distribution database for project scenario p against baseline scenario b in year y
= 1,098 * Total Technology days * (1 - damaged stove discount (10%))
= 444,450 days

$U_{p,y}$ Cumulative usage rate for technologies in baseline scenario p in year y,
= 79%

TEMPLATE- Monitoring Report

ER_{b,y,CO_2} Specific CO₂ emission savings for an individual technology of Baseline b in year y , in tCO₂ (75% usage adjusted) as derived from the statistical analysis of the data collected from the field tests
= 0.0211 tCO₂/day

$ER_{b,y,nonCO_2}$ Specific non-CO₂ emission savings for an individual technology of Baseline b in year y , in tCO₂ (90% usage adjusted) as derived from the statistical analysis of the data collected from the field tests
= 0.0011 tCO₂/day

$$ER_{b,p,y,CO_2} = \sum_i \{ f_{NRB,b,i,y} * B_{b,y,i} * NCV_{b,i} * EF_{b,i,CO_2} \}$$

Where:

$f_{NRB,b,i,y}$ Fraction of woody biomass used in year y for fuel type i that can be established as non-renewable biomass (NRB)
= 0.91

$B_{b,y,i}$ Fuel consumption for fuel type i used in baseline b in year y in tonnes, from baseline KPTs
= 2.5630t

$NCV_{b,i}$ Net calorific value of the fuel type i used in baseline b (TJ/tonnes)
= 0.0295

EF_{b,i,CO_2} CO₂ emission factor of the fuel type i used in the baseline
= 3.304 tCO₂/tonne of charcoal

i Fuel Type

$$ER_{b,p,y,nonCO_2} = \sum_i \{ B_{b,y,i} * NCV_{b,i} * EF_{b,i,nonCO_2} \} - \sum_i \{ B_{p,y,i} * NCV_{p,i} * EF_{p,i,nonCO_2} \}$$

Where:

$EF_{b,i,nonCO_2}$ non-CO₂ emission factor of the fuel type i used in the baseline
= 0.173 tCO₂/tonne of charcoal

SDG 1: No Poverty

$BSA_{Baseline}$ Number of ICS distributed in baseline = 0

$HHS_{Baseline}$ % HH reporting money saving due to reduced fuel consumption in baseline
= 0

SDG 3: Good Health and Well Being

Gold Standard *Climate Security and Sustainable Development*

$SPM_{HH,Baseline}$ % HH reporting reduction in smoke/PM emissions while cooking on improved stove in baseline
= 0

SDG 5: Gender Equality

$HHTS_{Baseline}$ % HH reporting time saving from fuel collection due to reduced fuel consumption in baseline
= 0

SDG 7: Affordable and Clean Energy

$ACS_{Baseline}$ Access to affordable and clean energy (Number of operating ICS units under Baseline)
= 0

SDG 8: Decent Work and Economic Growth

$QE_{IG_{Baseline}}$ Quantitative Employment and income generation (Number of person (male and female) hired under Baseline)
= 0

SDG 12: Responsible Consumption and Production

$B_{b,y,i}$ Fuel consumption for fuel type i used in baseline b in year y in tonnes, from baseline KPTs
= 2.5630t (KPT value retrieved from Baseline KPT's)

E.2. Calculation of project value or estimation of project situation of each SDG Impact

SDG 13: Climate Action

For a complete overview of the ex-ante and ex-post CO₂ equivalent emissions reductions calculations please refer to the VPA Emissions Reductions Calculation Sheet.

The overall GHG reductions achieved by the project activity will be calculated as follows:

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$$ER_y = \sum BE_{b,y} - \sum PE_{p,y} - \sum LE_{p,y}$$

Where:

ER_y Emission reduction for total project activity in year y (tCO₂e/yr)
= 5,902

$BE_{b,y}$ Baseline emissions for baseline scenario b in year y (tCO₂e/yr)
= 7,783

$PE_{p,y}$ Project emissions for project scenario p in year y (tCO₂e/yr)
= 1,880

$LE_{p,y}$ Leakage for project scenario p in year y (tCO₂e/yr)
= 0

As per the methodology the governing equation for the emission reduction calculations is as follows with $(\sum BE_{b,y} - \sum PE_{p,y})$ is directly merged in to the following equation.

$$ER_y = \sum_{b,p} N_{p,y} * U_{p,y} * (ER_{b,p,y,CO_2} + ER_{b,p,y,nonCO_2}) - \sum LE_{p,y}$$

Where:

$\sum_{b,p}$ Sum over all relevant (baseline b/project p) couples
= 1,098 ICS

$N_{p,y}$ Cumulative number of project technology-days included in the sales/distribution database for project scenario p against baseline scenario b in year y
= 1,098 * Total Technology days
= 444,450

$U_{p,y}$ Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)
= 79%

ER_{b,p,y,CO_2} Specific CO₂ emission savings for an individual technology of Project against an individual technology of Baseline b in year y, in tCO₂ (90% usage adjusted) as derived from the statistical analysis of the data collected from the field tests
= 0.01601 tCO₂e/day

$ER_{b,p,y,nonCO_2}$ Specific non-CO₂ emission savings for an individual technology of Project against an individual technology of Baseline b in year y, in tCO₂ (90%

usage adjusted)as derived from the statistical analysis of the data collected from the field tests

= 0.00084 tCO₂e/day

LE_{p,y} Leakage for project scenario p in year y (See Section E.3)

= 0%

= 0 tCO₂e/yr

$$ER_{b,p,y,CO_2} = \sum_i \{ f_{NRB,b,i,y} * B_{b,y,i} * NCV_{b,i} * EF_{b,i,CO_2} \} - \sum_i \{ f_{NRB,b,i,y} * B_{p,y,i} * NCV_{p,i} * EF_{p,i,CO_2} \}$$

Where:

$f_{NRB,b,i,y}$ Fraction of woody biomass used in year y for fuel type i that can be established as non-renewable biomass (NRB)

= 0.91

$B_{b,y,i}$ Fuel consumption for fuel type i used in baseline b in year y in tonnes, from baseline KPTs

= 2.5630t

$B_{p,y,i}$ Fuel consumption for fuel type i used in project p in year y in tonnes, as derived from the statistical analysis of the data collected from the field tests

= 0.6190t

$NCV_{b,i}$ Net calorific value of the fuel type i used in baseline b (TJ/tonnes)

= 0.0295

$NCV_{p,i}$ Net calorific value of the fuel type i used in project p (TJ/tonnes)

= 0.0295

EF_{b,i,CO_2} CO₂ emission factor of the fuel type i used in the baseline

= 3.304 tCO₂/tonne of charcoal

EF_{p,i,CO_2} CO₂ emission factor of the fuel type i used in the project

= 3.304 tCO₂/tonne of charcoal

= 3.304 tCO₂/tonne of charcoal

i Fuel Type

$$ER_{b,p,y,nonCO_2} = \sum_i \{ B_{b,y,i} * NCV_{b,i} * EF_{b,i,nonCO_2} \} - \sum_i \{ B_{p,y,i} * NCV_{p,i} * EF_{p,i,nonCO_2} \}$$

Where:

$EF_{b,i,nonCO_2}$ non-CO₂ emission factor of the fuel type i used in the baseline

= 0.173 tCO₂/tonne of charcoal

$EF_{p,i,nonCO_2}$ non-CO₂ emission factor of the fuel type i used in the project

= 0.173 tCO₂/tonne of charcoal

LE_y Leakage for project scenario p in year y

= 0%

SDG 1: No Poverty

$$\begin{aligned}\text{Net Benefit (SDG 1)} &= \text{BSA}_{\text{Project}} - \text{BSA}_{\text{Baseline}} \\ &= 1,098\end{aligned}$$

Where:

$\text{BSA}_{\text{Baseline}}$ Number of ICS distributed in baseline = 0

$\text{BSA}_{\text{Project}}$ Number of ICS distributed in Project = 1,098

$$\begin{aligned}\text{Net Benefit (SDG 1)} &= \text{HHS}_{\text{Project}} - \text{HHS}_{\text{Baseline}} \\ &= 100\%\end{aligned}$$

Where:

$\text{HHS}_{\text{Baseline}}$ % HH reporting money saved from reduced charcoal consumption in baseline = 0

$\text{HHS}_{\text{Project}}$ % HH reporting money saved from reduced charcoal consumption in project = 100%

SDG 3: Good Health and Well Being

$$\begin{aligned}\text{Net Benefit (SDG 3)} &= \text{SPM}_{\text{HH,Project}} - \text{SPM}_{\text{HH,Baseline}} \\ &= 100\%\end{aligned}$$

Where:

$\text{SPM}_{\text{HH,Baseline}}$ % HH reporting reduction in smoke/PM emissions while cooking on improved stove in baseline = 0

$\text{SPM}_{\text{HH,Project}}$ % HH reporting reduction in smoke/PM emissions while cooking on improved stove in project = 100%

SDG 5: Gender Equality

$$\begin{aligned}\text{Net Benefit (SDG 5)} &= \text{HHTS}_{\text{Project}} - \text{HHTS}_{\text{Baseline}} \\ &= 99\%\end{aligned}$$

Where:

$\text{HHTS}_{\text{Baseline}}$ % HH reporting time saving from cooking on a more efficient stove

= 0

$\text{HHTS}_{\text{Project}}$ % HH reporting time saving from cooking on a more efficient stove = 99%

SDG 7: Affordable and Clean Energy

$$\begin{aligned}\text{Net Benefit (SDG 7)} &= \text{ACS}_{\text{Project}} - \text{ACS}_{\text{Baseline}} \\ &= 1,098\end{aligned}$$

Where:

$\text{ACS}_{\text{Baseline}}$ Access to affordable and clean energy (Number of operating ICS units under Baseline)
= 0

$\text{ACS}_{\text{Project}}$ Access to affordable and clean energy (Number of operating ICS units under Project)
= 1,098

SDG 8: Decent Work and Economic Growth

$$\begin{aligned}\text{Net Benefit (SDG 8)} &= \text{QE IG}_{\text{Project}} - \text{QE IG}_{\text{Baseline}} \\ &= 18\end{aligned}$$

Where:

$\text{QE IG}_{\text{Baseline}}$ Quantitative Employment and income generation (Number of person (male and female) hired under Baseline)
= 0

$\text{QE IG}_{\text{Project}}$ Quantitative Employment and income generation (Number of person (male and female) hired under Project)
= 18

SDG 12: Responsible Consumption and Production

$$B_{y,\text{savings}} = B_{b,y,i} - B_{p,y,i}$$

Where:

$B_{y,\text{savings}}$ Reduction in domestic fuel consumption (tonnes/year)
= 1.9439t

$B_{b,y,i}$ Fuel consumption for fuel type i used in baseline b in year y in tonnes, from baseline KPTs
= 2.5630t

$B_{p,y,i}$ Fuel consumption for fuel type i used in project p in year y in tonnes, as derived from the statistical analysis of the data collected from the field tests
= 0.6190t

E.3. Calculation of leakage

$LE_{p,y}$ Leakage for project scenario p in year y

= 0 tCO₂e/yr

Justification:

<i>The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.</i>	The traditional stoves replaced are inefficient charcoal braziers. These are rudimentary devices, crafted locally and have no market value. Households outside the project boundary can set up their own charcoal braziers and hence there is no risk that the baseline devices from the project can move outside the boundary. This leakage source can therefore be discounted.
<i>The non-renewable biomass or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources.</i>	There is no risk of this as non-renewable biomass is available in abundance within the project boundary and there is no scenario where the NRB saved from this VPA will be used by non-project users. This leakage source can therefore be discounted.
<i>The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario.</i>	Considering the size of the project boundary, rate of deforestation and the size of the VPA there is no risk that the VPA impacts the NRB of the project wood collection area. Furthermore, the fNRB will be re-assessed at the start of the subsequent VPA crediting period.
<i>The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology.</i>	The climate in Zambia is temperate to hot. There is very little space heating by baseline charcoal stoves in the population. No evidence exists that the project will result in increased fuel use for heating from inefficient stoves. The end-user habit surveys found no other fuel

	usage in project households other than charcoal. Project KPTs also cover all fuel use in the household and so ensure that any fuel usage, other than cooking, is also accounted for in the project scenario. As per the KPT protocol, the total amount of charcoal used daily by each sampled household is measured/weighed. The charcoal is not separated and weighed for different activities but rather all the charcoal used on a daily basis is weighed/measured. This includes the use of charcoal for other practices such as heating and even charcoal used in other stove types. Therefore, there is no possible leakage in this scenario.
<i>By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.</i>	The baseline appliances, as documented in the PDD and established through the baseline surveys, inefficient charcoal braziers. The use of braziers is commonplace in Zambia and is a more GHG intensive technology than the ICS distributed in the project scenario.

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline values	Project values	Net benefit
13	Tonnes CO ₂ equivalent emissions	7,783	1,880	5,902
1	Number of ICS distributed	0	1,098	1,098
3	% HH reported reduction in smoke/PM Emissions while cooking on ICS	0	100%	100%

TEMPLATE- Monitoring Report

5	% HH reporting time saving from cooking due to more efficient stove	0	99%	99%
7	Access to affordable and clean energy (number of ICS distributed)	0	1,098	1,098
8	Quantitative employment and income generation (Number of persons hired)	0	18	18
12	Charcoal fuel savings while cooking on project ICS in tonnes per annum	2.5630	0.6190	1.9439

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ⁶ achieved during this monitoring period
13	6,353 (tCO ₂ e)	5,902 (tCO ₂ e)
1	1,127 (Number of ICS distributed)	1,098 (Number of ICS distributed)
3	100%	100%
5	100%	99%
7	1,127 (Number of ICS distributed)	1,098 (Number of ICS distributed)
8	30 (Number of persons hired)	18
12	2.0857 (tonnes/year)	1.9439

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

⁶ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

Ex-ante values were higher than ex-post values calculated after pKPTs were conducted. This is because the estimated pKPT value of 0.4773 tonnes per household per year used for the ex-ante calculations was lower than the actual pKPT $B_{p,y,i}$ value of 0.6190 tonnes per household per year. Also, the ex-ante calculations did not include a discount factor for the damaged or lost stoves and so used the original technology days value of 402,600 days, while the actual value for the ERs was calculated using the total technology days once a 10% discount was applied for the damaged or lost stoves.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

No increase is perceived. Values are all below estimates.

SECTION F. SAFEGUARDS REPORTING

Risk identified in PDD	Actions to Mitigate	Mitigated? (yes/no)
Principle 6.1 Labour Rights: The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions	This is in effect a monitored parameter (QE IG) for SDG 8. Legal employment contracts for project staff in Zambia are provided to the VVB as evidence. Stove manufacturers will be required to show suitable, up-to-date OHS policy.	Yes
Principle 6.1 Labour Rights: Working agreements with all individual workers shall be documented and implemented and include: a. Working hours (must not exceed 48 hours per week on a regular basis), AND b. Duties and tasks, AND c. Remuneration (must include provision for payment of overtime), AND d. Modalities on health insurance, AND e. Modalities on termination of the contract with provision	This is in effect a monitored parameter (QE IG) for SDG 8. Legal employment contracts for project staff in Zambia are provided to the VVB as evidence.	Yes

for voluntary resignation by employee, AND f. Provision for annual leave of not less than 10 days per year, not including sick and casual leave.		
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SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

A joint stakeholder consultation and stakeholder feedback round was conducted for GS11145 TASC Clean Cooking PoA – VPA 1 (Zambia), GS11596 TASC Clean Cooking PoA – VPA 3 (Zambia), GS11604 TASC Clean Cooking PoA – VPA 4 (Zambia) and all subsequent VPA's based in Zambia. The in-person stakeholder consultation was held on 19/05/2022 and the stakeholder feedback round was held from 27/06/2022 to 27/08/2022. Feedback and responses received during the local stakeholder consultation and feedback round can be found in the LSC report labelled "TASC GS11009 Stakeholder Consultation Report Zambia v1.0".

TASC runs a call center and grievance book from its HQ in Lusaka, allowing stakeholders to make continuous input and log grievances by phone, also as physically in person, an image of the logbook is included below.



There were no inputs and grievances received during the monitoring period.

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

There are no stakeholder mitigations agreed in the monitoring period.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

There were no legal contests during the monitoring period.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption