



Application Form for the Cold Chain Equipment (CCE) Optimisation Platform – supplementary material to Health System Strengthening (HSS) requests for January and May 2016 submissions only

Deadlines for submission of application:

15 January 2016

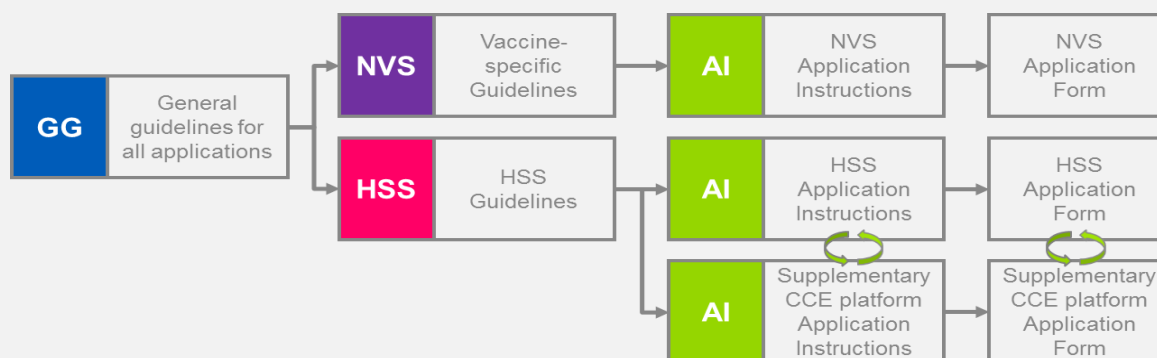
1 May 2016¹

Document dated: December 2015

NOTE: 2016 will be a development and learning period for the CCE optimisation platform. This supplementary material will be adapted and evolve as Gavi gains experience from the implementation of the platform (including for September 2016 submissions).

Application documents for 2016:

Countries applying for all types of Gavi support in 2016 are advised to refer to the following documents in the order presented below:



<p style="text-align: center;">Supplementary CCE platform Application Form</p>	<p>Purpose of this document:</p> <p>This application form must be completed in order to apply for Gavi's CCE optimisation platform support. Applicants are required to read the Supplementary CCE optimisation platform application instructions prior to completing this application form. Applicants should first read the general guidelines for all types of support as well as the HSS guidelines before this document. The application form, along with any attachments, must be submitted in English, French, Portuguese, Spanish, or Russian.</p>
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¹ CCE optimisation platform application materials may be updated for subsequent deadlines based on learnings from the first applications.

Weblinks and contact information:

All application documents are available on the Gavi apply for support webpage: www.gavi.org/support/apply. For any questions regarding the application guidelines or to submit the application form, please contact proposals@gavi.org or your Gavi Senior Country Manager (SCM).

CONTENTS

Part A: Summary of support requested and applicant information 1

Part B: Application objectives 5

Part C: CCE situation 7

Part D: Requested support 10

Part E: Implementation details 10

Part F: M&E details 14

Part G: List of Mandatory and Optional Attachments 15

PART A: SUMMARY OF SUPPORT REQUESTED AND APPLICANT INFORMATION

1. Applicant information	
Country name	Uganda
Date	May 2016
Name & job title	Dr. Opar Bernard Toliva
Email address	bopato@gmail.com
Phone	+256 772 469 323
Total funding requested from CCE platform (US \$)	This should correspond exactly to the budget requested in Question 9 (detailed budget) 10,760,228 USD.
Does your country have an approved HSS grant on-going?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Indicate the end year of the HSS 30th June, 2016
Proposed CCE platform grant start date:	Indicate the month and year of the planned start date of the grant based on the strategic deployment plan July 2017
Proposed CCE platform grant end date:	Indicate the month and year of the planned end date of the grant based on the strategic deployment plan December 2021

2. Executive Summary (Maximum 2 pages)

Provide an executive summary of the application.

The preparation process for the application and supporting documents was led by the Ministry of Health/UNEPI/NMS – cold chain and logistics team in collaboration with EPI partners (UNICEF, CHAI, PATH, WHO) through a series of meetings and workshops. Presentations were made to top management and the Health Policy Advisory Committee (HPAC) for approval and endorsement.

The EPI program currently provides immunization with 10 childhood antigens namely BCG, OPV, DPT-HepB-Hib, Measles, PCV, HPV, as well as TT for pregnant women and women of child bearing age. Planned new vaccine introductions including Inactivated Polio Vaccine (IPV) in Q2 2016, Rotavirus vaccine in Q3/4 2016, Tetanus-Diphtheria (Td) in 2017 and Measles-Rubella in 2018 will require an expansion of positive storage volume requirement by 67% from 80.5cm³ to 134.2cm³. Since implementation of the 2013 UNEPI revitalization plan, Uganda has seen improvements in national-level routine immunization coverage. According to administrative data, DPT3 coverage improved significantly from 78% in 2012 to 99% in 2014. However, WHO/UNICEF estimates of national immunization coverage (WUENIC) 2014 place DPT3 at 78% in 2014. Differences may be attributed to data quality issues currently being addressed in HSS.

Uganda operates three supply chain levels: the Central Vaccine Store (CVS), District Vaccine Stores (DVS) and Health Facility level. UNEPI has a managerial structure to ensure efficient service delivery. National Medical Stores (NMS) is responsible for storage and distribution of vaccines and other immunization supplies to all 112 districts from the CVS on a monthly basis. Key bottlenecks to

immunization coverage include human resource gaps at all levels of the health system (EPI Review 2015), existence of sub optimal equipment in the cold chain which are costly to operate and maintain affecting availability and potency of vaccines of vaccines below sub national levels.

According to the Cold Chain Equipment Management (CCEM) Inventory tool as of February 2016, majority (65%) of facilities with CCE have sufficient storage capacity against 2020 needs however, there is a significant volume of sub-optimal equipment (>10 years, unrepairable, non-PQS, absorption) which has impacted the availability and potency of vaccines. 36% of CCE are obsolete (>10 years old), an additional 11% will reach > 10 years old in the next 5 years, 58% of CCE are no longer listed on PQS, including 50.9% that are gas-reliant models which are costly to operate and maintain. In 2013 and 2014, NMS spent ~1.2m² USD per year to replenish and distribute gas nationwide. The cost of gas replenishment and distribution in 2015 was ~ \$900,000 which was inadequate attributing to the gas stock outs reported thereby affecting the availability of vaccines below sub-national level. This issue of unreliable gas supply is further exacerbated by lack of access to electricity in 72%³ of facilities as only 5% of the rural population has access to electricity service⁴. Currently, where power is available, challenges of power outages and failure to meet electricity bills affects availability of vaccines at these sites.

Furthermore, the weaknesses identified in temperature monitoring by the EVM Assessment (2014) indicate that district vaccine stores and health facilities may be posing serious risks to the potency of vaccines through extended periods of temperature excursions. While CCE are largely functional, the availability of district level cold chain technicians (available in 40% of districts) severely limits the maintenance of non-functional equipment. The challenges related to maintenance have been prioritized in HSS II with more innovative ways to improve maintenance below sub-national level by leveraging the existing regional biomedical maintenance structure to bring maintenance services closer to districts in need of skilled cold chain technicians.

Currently, 57% (2982) of health facilities (n=5200⁵) have vaccine storage facilities creating access barriers to immunization in various areas across the country. In addition, only 65% of facilities with CCE and 88% of District Vaccine Stores have sufficient storage capacity against 2020 needs. Uganda aims to address the cold chain equity gap by equipping 367 facilities that currently do not have CCE including remote/hard to reach areas, replacing and increasing capacity at 2183 facilities identified with inadequate storage space and sub-optimal CCE. Therefore, higher level facilities like hospitals and HC IV have been allocated higher capacity fridges compared to lower level facilities (HCIII and HCII).

Allocation of this equipment takes into account the geographical equity by expanding distribution of CCE to districts with low access to immunization services and hard to reach areas. 83% (2,171) of CCE will go to HC III and HC II for both replacement and expansion to bring immunization services closer to the community. 6% (166), 4% (115) and 8% (178) of CCE will be allocated to DVS, Hospitals and HC IV respectively. Through this application, the country proposes to procure and deploy 2630 fridges and freezers which include; 1933 SDD refrigerators, 526 ice-lined refrigerators and 137 freezers. In addition, 797 voltage stabilizers and 5710 fridge tag-2 will be procured by 2020 at a total cost of \$10.76 million (including distribution, training, installation costs and 5% of program support costs). Uganda proposes to co-finance 20% (\$2.15m) of this amount through from the new HSS II application developed in 2016. Additional gaps will be addressed through equipment proposed under the HSS II application that is not eligible for the platform: spare parts (existing non-eligible equipment), 31 TCW3000SDDs, 3 TCW3000ACs, 1155 cold boxes, 5000 vaccine carriers, 9290 Fridge Tag 2 devices, 10 generators and 46 voltage stabilizers.

Equipment has been chosen based on the following parameters: the criteria for optimal equipment laid-out in Gavi's "Cold Chain Equipment Optimisation Platform" technology guide, experiences from

² NMS vaccine team reports

³ CCEM February 2016

⁴ Rural Electrification Strategy and Plan 2013-2022

⁵ 2014 Ministry of Health-Health Facility Inventory

performance of CCE in the country, specifications laid-out in the PQS guide and total cost of ownership analysis.

The objective of this application is to strengthen the logistics and supply chain management system of UNEPI/NMS in order to improve quality of vaccines and accessibility at all levels of the health system by:

- Upgrading the current CCE in the country's EPI system to be WHO PQS compliant for better effectiveness and efficiency of the entire UNEPI cold chain system up to the point of service delivery.
- Expanding the cold storage capacity for vaccines at all levels of the health system to adequately accommodate all vaccines through 2020.
- Improving quality management system of vaccines and cold chain equipment.
- Implementing the EPI cold chain preventive maintenance plan to have an efficient and effective cold chain system that will ensure availability of potent vaccines.

Implementation will start with the UNICEF procurement process, to begin once Gavi approves the proposal. Upon receipt, storage and distribution of equipment shall be undertaken by National medical Stores mandated to complete that task. Electric CCE will be tested for functionality and engraved here; SDD equipment will be tested at the installation site. Any damages incurred during transit shall be logged at this point and information provided to UNICEF and the clearing agent for action. The manufacturers will provide training to the experienced team of technicians who conducted the installation of SDDs in 2015 and will oversee the installation process. This team includes national and district cold chain technicians as well as MOH/Infrastructure Department engineers. Deployment of CCE proposed through this application is anticipated to commence in Q1 of 2018. A comprehensive CCE maintenance plan has been developed and provides guidance on how CCE shall be maintained.

In addition to regular temperature monitoring, the Ministry of Health with support from Gavi has a monitoring and evaluation specialist dedicated to the program to track progress of key activities and indicators. Uganda currently tracks 3 CCE related indicators related to proportion of health facilities with functional CCE, availability of sufficient storage capacity and proportion of CCE that is functioning. Data is collected through broad health system assessments as well as on-site assessments of equipment following support supervision, cold chain updates and repair and maintenance activities. The Ministry of Health shall continue to utilize these mechanisms to track key platform indicators.

3. Acronyms

Provide a full list of acronyms used in this application.

Acronym	Acronym meaning
30DTRs	30 Day Temperature Recorders
BCG	Bacillus Calmette-Guérin
CCE	Cold Chain Equipment
CCEM Tool	Cold Chain Equipment Management Tool
CCI	Cold Chain Inventory
CCREP	Cold Chain Replacement and Expansion Plan
CE	Cost Estimate
CHAI	Clinton Health Access Initiative
CVS	Central Vaccine Store
DCCA	District Cold Chain Assistant

DCCT	District Cold Chain Technician
DPT-HepB-Hib	Diphtheria, Pertussis, Tetanus, Hepatitis B, Haemophilus Influenza type b
DVS	District Vaccine Store
EPI	Expanded Programme for Immunization
EVM	Effective Vaccine Management
HC	Health Centre
HF	Health Facility
HPAC	Health Policy Advisory Committee
HPV	Human Papilloma Virus
HSS	Health Systems Strengthening
IPV	Inactivated Polio Vaccine
MR	Measles Rubella
NMS	National Medical Stores
OPV	Oral Polio Vaccine
PATH	PATH
PCV	Pneumococcal Conjugate Vaccine
PQS	Performance, Quality, and Safety
SDD	Solar Direct Drive
Td	Tetanus and Diphtheria
TT	Tetanus Toxoid
UNEPI	Uganda National Expanded Programme on Immunization
UNICEF	United Nations Children's Fund
UNICEF SD	United Nations Children's Fund Supply Division
URA	Uganda Revenue Authority
WHO	World Health Organization
WICR	Walk in Cold Room
WIFR	Walk In Freezer Room
WUENIC	WHO/UNICEF Estimates of National Immunization Coverage

4. Signatures

4a. Government endorsement

*Include Minister of Health and Minister of Finance endorsement of the proposal – **Mandatory Attachment #1.***

We, the undersigned, affirm that the objectives and activities of the Gavi proposal are fully aligned with the national health strategic plan (or equivalent), and that the funds for implementing all activities, including domestic funds and any needed joint investment, will be included in the annual budget of the Ministry of Health.

Minister of Health (or delegated authority)	Minister of Finance (or delegated authority)
Name: Hon. Elioda Tumwesigye	Name: Hon. Matia Kasaija
Signature:	Signature:
Date:	Date:

4b. HSCC/ICC (or equivalent) endorsement

Include official endorsement of the proposal – **Mandatory Attachment #2**

Include a signature of each committee member in attendance and date.

Mandatory Attachment #2: HSCC/ICC Endorsement of Proposal

We the members of the HSCC, or equivalent committee, met on the _____ (date) to review this supplementary proposal. At that meeting we endorsed this proposal on the basis of the supporting documentation which is attached. The minutes of the meeting endorsing this proposal are attached to this application.

Please list all committee members	Title / Organisation	Name	Sign below to confirm:	
			Attendance at the meeting where the proposal was endorsed	Endorsement of the minutes where the proposal was discussed
Chair				
Secretary				
MOH members				
Development partners				
CSO members				
WHO				
UNICEF				
Other				

PART B: APPLICATION OBJECTIVES

5. Impact of the supply chain, and in particular CCE, on coverage and equity goals (Approximately 1 page)

What is the coverage gap? What supply chain challenges have been created or exacerbated by [non-functional or poorly performing] cold chain equipment? How does supply chain impact coverage & equity in your country? How does CCE impact coverage & equity in your country?

Provide: Mandatory Attachment #4: Most recent EVM Improvement plan and Mandatory Attachment #5: Most recent Progress Report on the EVM Improvement Plan Implementation

According to administrative data, DPT3 coverage improved significantly from 78% in 2012 to 99% in 2014⁶. However, WHO/UNICEF Estimates of National Immunization Coverage (WUENIC) 2014 place DPT3 at 78% in 2014. The coverage discrepancies have been attributed to data quality issues currently being addressed through HSS efforts by the Ministry of Health and Health development

⁶ DHIS

partners. Among the districts, there exists inequity in performance. In 2015, 34 (30%) districts had DPT3 coverage of less than 90%.

Vaccines stock outs were also reported throughout 2015 across the supply chain as follows; at the national level, no absolute stock outs were reported⁷. In 2015, however, for 9/12 months, stock levels of at least 1 vaccine went below minimum level less 25% of the needs. 6% of DVSSs reported stock outs for vaccines in January, 5% in March, 11% in April, 15% in May, 15% in July, 5% in September, 2% in November and 3% in December 2015 affecting coverage in the districts. Vaccine stock outs were also reported⁸ in 71% of the facilities 3 months prior to the 2015 combined EPI review assessment, with commonly reported stock outs for BCG (38%) and PCV (45%).

Impact of sub-optimal CCE on immunization coverage and equity

Despite the progress that has been made in expanding immunization coverage and equity, the significant volume of sub-optimal equipment in the cold chain has affected the availability of vaccines resulting from continuous CCE break downs and gas stock outs. In 2015, reports from districts to UNEPI and NMS have reported gas stock outs below sub-national level attributed to limited availability of funds to NMS for both vaccines and gas (replenishment and distribution). As a result, this is affecting availability of vaccines at lower levels. In the 2014 Cold chain inventory, 22% of gas cylinders were found empty impacting on the number of immunization sessions conducted at facilities.

As noted in the Cold Chain Replacement and Expansion plan 2016-2020⁹, 36% of CCE are >10 years old, 11% will be >10 years old in the next 5 years and 58% of CCE are no longer listed on PQS. Therefore while CCE are largely functional at facilities, the availability of district level cold chain technicians (available in 40% of districts¹⁰) severely limits maintenance of poor performing equipment identified at facilities. In addition, 50.9% of CCE are gas-reliant models that are costly to operate and maintain. The refill price of Liquefied Petroleum Gas has increased from \$29.3 to \$34.5 to date. For the past 3 years, NMS estimated expenditure on gas replenishment and distribution totals up to \$3.27m an investment which can no longer be sustained. Despite the Government of Uganda's effort to increase access to electricity (rural electrification program), challenges of power shortages and failure to meet electricity bills are hindrances to quality vaccine storage hence facilities often have to find alternative storage facilities for their vaccines affecting availability of vaccines.

Currently, 57% (2982) of health facilities (n=5200¹¹) have vaccine storage facilities creating access barriers to immunization in various areas across the country. In addition, only 65% of facilities with CCE and 88% of District Vaccine Stores have sufficient storage capacity against 2020 needs. According to UNEPI policy, all health facilities in a community with in a 5km radius are eligible for cold chain equipment provided they have infrastructure that includes permanent buildings, adequate staffing and security. Special consideration is usually given to remote areas/communities. Accessibility to immunization services has been measured by determining districts with low immunization coverage for DPT1 and determining the level of cold chain coverage within those districts. To address cold chain equity gaps in vaccine coverage, Uganda plans to expand cold chain equipment coverage by 7% to health facilities (367) without cold chain equipment including hard to reach/remote areas and rehabilitate and increase cold chain capacity at health facilities identified with inadequate storage or sub optimal equipment.

Impact of supply chain bottlenecks on immunization coverage and equity.

A number of supply chain bottlenecks creating barriers to immunization coverage and equity have been identified in various country assessments. The EPI Review (2015) identified; human resource gaps at all levels, limited resources for conducting outreach (only 35% of health facilities tailored their outreach plans to address areas of low vaccine coverage), inadequate monitoring (EPI monitoring charts were absent at 60% of districts and 55% of HF) and inadequate supervision at lower levels.

⁷ NMS monthly stock status reports

⁸ Combined EPI review report 2015

⁹ CCEM tool February, 2016

¹⁰ Human Resources for Health Bi-annual report 2015

¹¹ 2014 Ministry of Health-Health Facility Inventory

The 2014 EVM assessment also identified key supply chain improvements specifically on temperature monitoring of CCE, maintenance, distribution and Information systems among others. These challenges hinder Uganda's ability to achieve equitable coverage and equity across the country. However, the program has made significant progress in addressing the identified bottlenecks affecting the supply chain¹².

Through the CCE platform, program interventions to address the bottlenecks will be sustained with the proposed activities in this proposal by strengthening the logistics and supply chain management system of UNEPI/NMS in order to improve quality of vaccines and accessibility at all levels by:

- Upgrading the current CCE in the country's EPI system to be WHO PQS compliant for better effectiveness and efficiency of the entire UNEPI cold chain system up to the point of service delivery.
 - Replacing sub-optimal CCE such as absorption refrigerators and aging equipment in order to better safe guard vaccine potency and lower overall operating costs of maintaining the cold chain system.
- Expanding cold storage capacity for vaccines at all levels to adequately accommodate all vaccines through 2020.
 - Increasing vaccine storage capacity to meet 2020 needs to ensure vaccine availability
 - Equipping facilities that currently do not have CCE including remote/hard to reach areas.
- Improving quality management system of vaccines and equipment.
 - Procuring 30 day temperature monitoring devices to monitor performance of equipment and voltage stabilizers to protect equipment from power surges.
- Implementing the EPI cold chain preventive maintenance plan to have an efficient and effective cold chain system that will ensure availability of potent vaccines. Among the new interventions to strengthen CCE maintenance is the proposed regional structure of cold chain technicians to supplement district and health facility level maintenance efforts leveraging existing regional maintenance workshops for biomedical equipment. This will increase facility-technician interface and ultimately reduce CCE down-time

As a result, 367 facilities that currently do not have CCE including remote/hard to reach areas will be equipped. 2183 facilities identified with inadequate storage space and sub-optimal equipment will be allocated new higher performing equipment. Allocation of this equipment takes into account the geographical equity by expanding CCE to districts with low access to immunization services and remote and hard to reach areas. 83% (2,171) of CCE will go to HC III and HC II where immunization services are offered. 6% (166), 4% (115) and 8% (178) of CCE has been allocated to DVS, Hospitals and HC IV respectively.

PART C: CCE SITUATION

6. Rationale for the specific need for rehabilitation and expansion in the country's CCE (Approximately 1 page)

Describe the existing CCE situation in the country, detail your rehabilitation and expansion request and explain on what basis it is needed.

*Provide: **Mandatory Attachment #6:** CCE inventory and facility segmentation, **Mandatory Attachment #7:** CCE rehabilitation and expansion plan.*

Cold Chain Equipment situation status

Significant improvements have been made to address the capacity gaps identified in the CCI report 2014 and EVM Assessment report 2014 at national, district and health facility level with the installation of new equipment in 2015 funded by Gavi HSS. To improve the cold chain system ahead

¹² EVMA improvement plan 2014

of new vaccine introduction in 2015 and 2016, the Ministry of Health with support from Gavi HSS I funds procured new cold chain equipment including; 12 Walk In Cold Room (WICR), 1 Walk In Freezer Room (WIFR), 879 fridges, 150 freezers, 1000 vaccine carriers and 5000 30DTRs. To strengthen the supply chain, transport equipment was also procured including; vehicles (pickups 65, vaccine truck 4, motorcycles 600, boats 10 and bicycles 1500). Following the installation of CCE, the CCEM inventory was updated.

National:

At the Central Vaccine Store (CVS), capacity is now adequate to store vaccines anticipated beyond 2020 with the installation of 12 new cold rooms and a freezer room in 2015 in addition to 3 functional existing cold rooms and 1 freezer room. Net vaccine storage capacity has increased from 39,400 Litres¹³ in 2014 to 178,100¹⁴ Litres in 2016. In addition, transport capacity for vaccines has also been improved at CVS level with the procurement of 4 refrigerated trucks.

The country has plans to construct a national warehouse which will house a new central vaccine store and a maintenance workshop at a new site. The new CVS will further increase available capacity for storage of vaccines at national level. Looking to the current Immunization Programme, Rotavirus vaccine, MR and Td are in the pipeline to be introduced in the coming one to three years. These vaccines are much more expensive and bulkier than the current vaccines in use. In addition to this, the population is expected to increase by 3.03% annually which needs to be taken into consideration in the future planning. Non EPI vaccines interventions are increasing substantially (Cholera, Yellow Fever, MenA, Malaria, HIV).

Districts and facilities:

At this level, the cold chain system has seen improvements in functionality and availability of optimal equipment. However, there still remains a significant portion of equipment that is sub optimal, costly to maintain and not sustainable in the long run. According to the February 2016 inventory update, 98% of CCE (n=4115) is working well. However;

- 36% of CCE is more than 10 years old and 11% is between 6-10 years of age and will be due for replacement in the next 5 years.
- 58% of current CCE is no longer listed on PQS.
- The cold chain is still reliant on gas with 50.9% of CCE using gas to power cold chain equipment. At the time of new procurements, majority of currently functional equipment was not replaced as priority was given to facilities without CCE and expansion of storage capacity to adequately accommodate HPV and Rotavirus. In the next 5 years, this equipment will be obsolete. The installation of new CCE in 2015 saw a reduction in gas powered CCE from 60.4% and increase from 21.7% to 29% and 17.7% to 19.9% in Ice Lined Refrigerators (ILRs) and solar respectively compared to the 2014 inventory. Shortage in gas reduces the availability of vaccines where facilities have to find alternative storage at nearby health facilities.
- At district level, available capacity has been increased from 19,971 in 2014 to 58,621 Litres in 2016. Districts now have adequate storage for Rotavirus to be introduced in Q3/4 2016. However, 12% of district vaccine stores have capacity gaps against 2020 needs limiting the ability to cater for larger populations and new vaccine introductions (MR and Td).
- At health facility level, 35% of facilities with existing CCE have capacity gaps against 2020 needs.

Through the platform, Uganda plans to procure; 1933 SDDs, 526 ILRs, 137 freezers, 5710 Fridge Tag 2 devices, 797 voltage stabilizers and spare parts. This will enable the EPI program to 1) equip facilities that currently do not have CCE including remote/hard to reach areas and facilities with identified vaccine storage gaps 2) phase out sub-optimal CCE such as absorption refrigerators and aging equipment in order to better safeguard vaccine potency and lower overall operating costs of maintaining the cold chain system 3) increase vaccine storage capacity to meet 2020 needs to ensure vaccine availability.

¹³ CCI report 2014

¹⁴ Independent assessment from UNICEF regional consultant

Criteria for installation and deployment of CCE has been based on the need to 1) fill the gaps as per the current vaccine schedule and inadequate capacity for new vaccines and replacing absorption, and CFC equipment, 2) remove absorption (RCWs) and specific models due to excessive operating costs (cost of procuring and distributing gas, maintenance costs, etc.) 3) remove equipment >10 years of age, 4) replace all Sibir V110GE and V170GE and 5) expand to new facilities that currently do not have CCE including remote/hard to reach areas.

By 2020, the country will have phased out all absorption systems and replace them with solar and gradually replace aging equipment with higher performing equipment.

7. Anticipated impact of the rehabilitation & expansion plan on enhancing the design of the supply chain to improve its efficiency/effectiveness (Approximately 1 page)

Describe how the proposed CCE rehabilitation and expansion plan will impact the system's design and contribute to the efficiency/effectiveness of the supply chain (accounting for the commissioning and decommissioning of CCE).

*Provide: **Mandatory Attachment #3: EVM Assessment report and Optional Attachment #13: Health system bottleneck analysis***

The proposed CCE interventions have systematically taken into account overall immunization system effectiveness and efficiency as elaborated below;

- The installation of new CCE will address capacity gaps identified at 12% of district vaccine stores and 35% of health facilities against the 2020 needs increasing availability of vaccines. By 2020, these districts and facilities shall have enough capacity to store vaccines taking into consideration planned and proposed new vaccine introductions including IPV, Rotavirus, MR and Td. Equipping 367 health facilities without CCE and hard to reach/remote areas with low coverage, will improve access to immunization services.
- Investment in higher performing CCE will deliver costs savings to the Ministry of Health. For the last 3 years, NMS estimates expenditure on gas replenishment and distribution to be ~\$3.27m. The investment in new CCE is expected to save the country ~\$3.45m in the form of energy costs by 2020¹⁵. Such funds can be put to better use including procuring vaccines. With support of Gavi HSS funds in 2015, reliance of the cold chain on gas has gradually reduced from 60.4% in 2014 to 50.9% in 2016.
- The plan will eliminate access barriers related to sub-optimal cold chain equipment and related factors like LP gas availability, unreliable and/or lack of access to electricity especially in most rural areas across the country. 72%¹⁶ of facilities have no access to electricity and less than 5%¹⁷ of the rural population has electricity service despite plans by the government to increase access to 22% by 2022. The planned solar equipments provide an alternative cost effective solution to the above challenges and will help eliminate these barriers to maintain adequate vaccine stocks at distribution and service delivery points.
- Disposal of obsolete equipment shall be initiated by UNEPI by generating a list of equipment to be disposed of on an annual basis. Approval for disposal shall be obtained from the procuring and disposing unit after which districts shall be notified to assemble all obsolete equipment at the DVS. CCE shall be picked up and delivered to a temporary storage site where disposal procedures shall commence.

¹⁵ CCEM 2016

¹⁶ CCEM 2016

¹⁷ Rural Electrification Strategy and Plan 2013-2022

PART D: REQUESTED SUPPORT

8. Total quantity and budget of CCE requested (incl. platform & country joint investment)

Please use the **CCE optimisation platform budget form** to list the yearly amount of support requested both in terms of number of units and cost (including both purchase and service bundle cost). Indicate and justify any additional requirement that you may have (e.g., manufacturer, features).



CCE Optimisation
Platform application

www.gavi.org/XXXXXXXXXXXXX<LINK TO BE UPDATED>

9. Justification for the scale and technology requested (Approximately 1/2 page)

Given the country's current or anticipated system design and CCE situation, justify that your request is at the right scale and for the right technology (number, capacity, type) to address the identified bottlenecks.

Provide: **Mandatory Attachment #8:** Equipment selection and **Optional Attachment #14:** Total cost of ownership analysis

Selection of most appropriate cold chain equipment for districts and facilities has been done taking into consideration 1) the available energy source, 2) ambient temperatures, 3) capacity requirement (vaccine and ice pack freezing), 4) holdover time and 5) past equipment performance based on total cost of ownership analysis.

Given that a vast majority of gas-based absorption refrigerators are operating in facilities without grid electricity and those that access electricity for less than 8 hours, SDD refrigerators have been proposed. The CCEM 2016 update showed that 72% of facilities don't have access to grid electricity. Despite plans to extend grid electricity to rural areas where lower level facilities are based from 5% in 2013 to 22% in 2022, challenges of power outages are a hindrance to meeting coverage targets.

Site segmentation¹⁸: Vaccine storage facilities were segmented according to 3 criteria; energy source, storage capacity based on the current and future vaccine requirements and accessibility determined by DPT1 coverage against the level of cold chain coverage.

Optimization/rationalization of equipment: Uganda has chosen to rationalize its CCE by selecting few models in order to facilitate management, training of users, monitoring and maintenance. Currently, more than 30 models exist in the cold chain system. Past experiences of CCE performance have informed the selection of CCE for districts and health facilities.

PART E: IMPLEMENTATION DETAILS

10. Description of equipment purchase and roll-out (Approximately 1 page)

Explain how will you manage the purchase and deployment of equipment and ensure that it is done as per your plans in a timely manner.

Provide: **Mandatory Attachment #9:** Strategic deployment plan and **Optional Attachment #15:** National Procurement Policy

¹⁸ CCE inventory and facility segmentation

A forecast of the cold chain requirements per year has been determined in the cold chain replacement and expansion plan 2016-2020. Equipment to be deployed by facility has been detailed in the deployment plan. The country's co-investment obligations (20%) of the budget have been incorporated in the HSS II application filed in parallel with the CCEOP application. Upon successful approval of the grants, the following shall happen;

Order of equipment and funds transfer

Following the experiences from the 2015 HSS procurements, ordering of equipment will be done through UNICEF Supply Division. The country shall benefit from economies of scale as a result of aggregated procurements and ensure timely procurement of equipment. Once funding for the platform is confirmed by Gavi, Ministry of Health shall organize for the required funds to be transferred to the UNICEF account to cater for CCE procurement, training, distribution and installation as per the service agreements with manufacturers.

The Ministry of Health shall raise a procurement order to UNICEF to procure the requested type and quantity of equipment for the first batch in Q3 2017 (July). The first batch of equipment shall be expected by the start of Q1 2018. On an annual basis, a new procurement order shall be generated to address CCE needs for that particular year.

Procurement, delivery to port and customs clearance

Once funds are transferred, UNICEF shall procure and deliver equipment to port. UNICEF shall handle customs clearance of all equipment procured. Medical equipment is exempted from taxes hence cold chain equipment shall not incur taxes. UNICEF shall deliver equipment to NMS or a government designated warehouse for testing (all electric equipment) and verification by Ministry of Health cold chain technicians. Ministry of Health stores department and NMS shall be responsible for verifying the number and status of equipment received. Testing, engraving, commissioning and distribution of equipment

Upon receipt of equipment, electric CCE shall be tested for functionality and engraved with all other equipment for the Ministry of Health asset registry. SDDs shall be tested for functionality at the installation site. A log of equipment performance status shall be maintained including all damages sustained during transit. Distribution will be executed as per the deployment plan.

Training and installation of equipment

The manufacturer in collaboration with Ministry of Health/NMS and EPI partners shall spearhead the training and installation of equipment utilizing existing cold chain technicians currently trained to install SDDs. The manufacturer shall supervise and audit the installations to ensure proper installation is done. Technical assistance was procured in 2015 to train a team of 30 technicians (UNEPI, MOH/Infrastructure Department, district cold chain technicians) to install SDDs. This will allow technicians to further build their capacity in installation of new equipment-SDDs. On an annual basis, district cold chain technicians will be re-oriented on how to better manage cold chain equipment.

Based on the recent experience in the installation of solar fridges in 2015, installation of an SDD was completed in 48 hours including testing for performance by 2 technicians per site.

Monitoring of cold chain equipment

Upon delivery and installation of equipment, NMS and Ministry of Health shall update the log of all distributions and installations made respectively. On a bi-annual basis, an update of the CCE inventory shall be conducted by Ministry of Health in addition to leveraging existing activities planned. On a monthly basis, the EPI focal person at each health facility will analyse each fridge's temperature chart, and compile a monthly review report that shall be submitted together with the monthly HMIS 105 report by the 3rd day of every month to the District Health Office where the DCCT will work

together with the Biostatistician to analyse and address any issues identified by health facility. The district cold chain technician shall send the summarized district monthly review report electronically to the centre on a monthly basis for analysis and follow up by the Ministry of Health.

11. Maintenance of purchased CCE (Approximately 1/2 page)

Summarize your routine maintenance and repair plans (that should guarantee the lifetime of the CCE funded by the platform). Please explain how staffing, training, and core maintenance activities contribute to the efficient management and maintenance of equipment.

Provide: **Mandatory Attachment #10: Maintenance plan**

Uganda's routine, corrective and preventive maintenance services are provided through an insourced model structured around the administrative levels of the cold chain, with dedicated focal persons at each level; CVS (7; 1 under NMS, 3 under Gavi and 3 under Government payroll), DVS (45 DCCTs and 67 DCCAs under Local Government) and health facility level (1 EPI focal person per facility under Local Government). Corrective maintenance is based on a request-escalation model. District cold chain technicians address maintenance requests from facilities and these are escalated to technicians at the central level if needed.

Uganda envisions an effective EPI cold chain system that tracks CCE functionality and offers timely support and response to equipment failure. On a monthly basis, the EPI focal person at each health facility will analyse each fridge's temperature chart, and compile a monthly review report that shall be submitted together with the monthly HMIS 105 report by the 3rd day of every month to the District Health Office where the DCCT will work together with the Biostatistician to analyse and address any issues identified by health facility. The district cold chain technician shall send the summarized district monthly review report electronically to the centre on a monthly basis for analysis and follow up by the Ministry of Health.

In addition, the program will strengthen CCE maintenance at district and health facility level by utilizing the existing Ministry of Health regional biomedical maintenance structure with support from HSS II. Emphasis will be put on empowering users at each health facility with basic preventive maintenance and monitoring skills to ensure timely problem identification to prevent exposure of vaccine to extreme temperature excursions. This will be done by;

- Expanding the scope of work for 9 regional workshops to include EPI under Ministry of Health-Infrastructure Department.
- Equipping the workshops; toolkits, spare parts, furniture.
- Providing transport.
- Capacity building for existing and new technicians.

Strengthening cold chain human resource capacity by conducting refresher maintenance and vaccine management training for the 9 workshops each staffed with 2 to 3 technicians and the 112 district cold chain technicians and assistants.

- Advocating to the District Local Government to fill vacant DCCT positions (60%). The DCCT structure is approved by Ministry of Public Service and districts need to be encouraged to implement this structure through the district local government funding.
- Facilitating regionals workshops to carry out additional tasks including maintenance, supervision and mentorship.
- Improving bottom-up information flow to prompt timely action.

The program has put in place measures to ensure CCE is managed and maintained at all levels.

- **Staffing:** Expansion of the scope of the regional workshops to include EPI maintenance will increase technician-facility interface thus improving periodic preventive equipment maintenance and therefore reducing equipment breakdown.
- **Capacity building:** Strengthening human resource capacity through user based and technical training will enable maintenance tasks to be resolved in a timely and cost effective manner at district and facility level.
- **Clear budget (spares, technicians) and process lines:** This minimizes delays in requesting and fulfilling maintenance request hence minimizing disruption in immunization services.
- **Visibility into maintenance needs:** A continuous temperature monitoring system has been introduced. This enables health workers to monitor performance of cold chain equipment and take corrective action immediately.

12. Source and certainty of country joint investment funding (Approximately 1/2 page)

List all the source of funding used to fund the country joint investment and describe their timing and level of certainty

The HSS II proposal has been jointly developed with the CCEOP proposal. This to the country is a synergy to health system strengthening to increase access and equity. The country joint investment funding (20%) has been incorporated into the HSS II proposal submitted. Therefore, joint investment funding for the cold chain equipment optimization platform relies upon approval of the HSS II application.

13. Technical assistance related to CCE

Is the country currently receiving technical assistance related to CCE?

Yes



No



Indicate the type, duration and provider of technical assistance

- **Cold chain planning:** UNICEF, WHO, CHAI, PATH support the Ministry of Health and NMS forecast CCE needs and prioritize cold chain activities that need to take place. This is done by holding meetings on a monthly basis.
- **CCE ordering and procurement:** UNICEF procures cold chain equipment and spare parts upon request from the Ministry of Health based on the procurement plan.
- **CCE installation and training:** UNICEF, CHAI, PATH support installation of CCE with emphasis on training and capacity building during implementation period.
- **CCE inventory updates:** CHAI and UNICEF support update of the cold chain inventory on a bi-annual basis.
- **Proposal development:** UNICEF, WHO, CHAI, PATH provide technical assistance through the proposal development process. to procure CCE and improve CCE management systems.
- **Information management system:** UNICEF, WHO, CHAI, PATH support the development of tools, dashboards to equip the Ministry

	<p>with reliable information for decision making.</p> <ul style="list-style-type: none"> • Support supervision: UNICEF, WHO, CHAI work hand in hand with the Ministry to review supervision checklists and monitor utilization and performance of CCE below sub-national level. • Capacity building for CCE: UNICEF, WHO, CHAI and PATH support the Ministry to build training guides, job aids to install, operate, manage and maintain CCE for optimal performance.
Future technical assistance planned	<p><i>Describe your likely requests in future years for CCE and system design technical assistance (if foreseeable)</i></p> <ul style="list-style-type: none"> • Design and development of an LMIS system to track stock, cold chain, spare parts among others in 2017/8. • Conduct an EVM Assessment in 2019/20. • EVM self-assessment to set new targets 2017. • Conduct a comprehensive cold chain inventory in 2018. • Review of immunization supply chain system assessment and redesign 2017/8.

14. Import tariff exemptions for CCE (Approximately 1/2 page)

Describe actions taken to secure import tariff exemptions for CCE and explain the current status of the tariff exemption waiver (accepted, rejected, pending)

*Provide: **Mandatory Attachment #11:** Proof of status for CCE tariff exemptions waiver*

UNICEF shall procure and handle customs clearance of all cold chain equipment procured. Therefore the UNICEF procurement policy shall apply.

Medical equipment is exempted from taxes hence cold chain equipment shall not incur taxes.

PART F: M&E DETAILS

15. Description of the monitoring system currently in use in the country (Approximately 1 page)

List the relevant CCE indicators currently tracked by the country and detail the mechanisms used to collect the data and validate its accuracy.

*Provide: **Mandatory Attachment #12:** National M&E Plan*

The Ministry of Health with support from Gavi has a monitoring and evaluation specialist dedicated to the program to track progress of key activities and indicators among others. CCE related indicators are tracked on a bi-annual or annual basis. Uganda currently tracks 3 CCE related indicators. These include;

- Proportion of immunizing health facilities that have a functional EPI refrigerator.
- Number of facilities with sufficient storage capacity.
- Proportion of functional cold chain equipment.

Data is collected through health assessments (cold chain inventories, cold chain updates), and on-site assessments of equipment following support supervision, repair and maintenance activities.

In addition to the above, the country also tracks EVM indicators detailed in the EVM improvement plan to track progress on the implementation of key recommendations. These revolve around the 9 EVM criteria. These indicators are also reviewed on an annual basis¹⁹.

16. Description of the country plan to report on the contribution of funded CCE to the vaccination program and the supply chain system strengthening (Approximately 1 page)

Describe how the country plans to report on the CCE platform indicators detailed in the Supplementary CCE Optimisation Platform Application Instructions, Annex 3 Table 7.

The country will utilize planned activities that include quarterly preventive maintenance and supportive supervision to collect data and report on CCE platform indicators. On a bi-annual basis, the Ministry of Health shall conduct cold chain inventory updates and report on the status of the cold chain. On an annual basis, the Ministry of Health shall report progress on CCE indicators to Gavi.

The CCE platform indicators to track are:

CCE platform indicator	Data Source	Baseline		Targets					Frequency
		Value	Year	2017	2018	2019	2020	2021	
Number of equipped facilities ²⁰ replacing cold chain equipment with higher performing equipment	Cold chain inventory update.	269	2016	0	635	1516	91	308	Annually
Number of previously unequipped facilities equipped with optimal cold chain equipment	Cold chain inventory update.	1042 ²¹	2016	0	162	105	0	100	Annually
Percent of functionality of cold chain equipment	Cold chain inventory update.	75%	2014	80%	80%	85%	90%	90%	Annually
Submission of an updated CCE inventory		1	2016	1	1	1	1	1	Annually
Percent of cold storage sites with sufficient capacity	Cold chain inventory update.	54%	2016	54%	66%	93%	95%	100%	Annually
Percent of fridges with alarms	Cold chain inventory update.	NA	2016	10%	10%	5%	5%	5%	Annually
Percent procurement compliance of cold chain equipment	Procurement plan	NA	2016	100%	100%	100%	100%	100%	Annually

PART G: LIST OF MANDATORY AND OPTIONAL ATTACHMENTS

Mandatory Attachments		
No.	Attachment	File link
1	Signature Sheet for the Minister of Health and Minister of Finance, or their delegates	
2	Signature Sheet for HSCC (or equivalent) endorsement	

¹⁹ EVM Improvement plan

²⁰ This indicator and the next considers the deployment of CCE

²¹ Considers the public and NGO facilities currently unequipped with CCE

Mandatory Attachments		
No.	Attachment	File link
3	Effective Vaccine Management (EVM) Assessment report (conducted within the preceding 5 years)	
4	Status of most recent EVM Improvement Plan (or provide justification and identify a plan for developing an improvement plan)	
5	Most recent Progress Report on the EVM Improvement Plan Implementation (should not be older than 6 months prior to application submission or provide justification as to why this is not available)	
6	CCE inventory and facility segmentation (<i>detailed in Application Instructions</i>)	
7	CCE rehabilitation and expansion plan (<i>detailed in Application Instructions</i>)	
8	Equipment selection (<i>detailed in Application Instructions</i>)	
9	Strategic deployment plan(<i>detailed in Application Instructions</i>)	
10	Maintenance plan with financing (<i>detailed in Application Instructions</i>)	
11	Proof of status for CCE tariff exemptions waiver	
12	National M&E Plan	

Optional Attachments		
No.	Attachment	File link
13	Health system bottleneck analysis	
14	Total cost of ownership analysis (<i>see TA package on Tech Net</i>)	
15	National Procurement Policy	