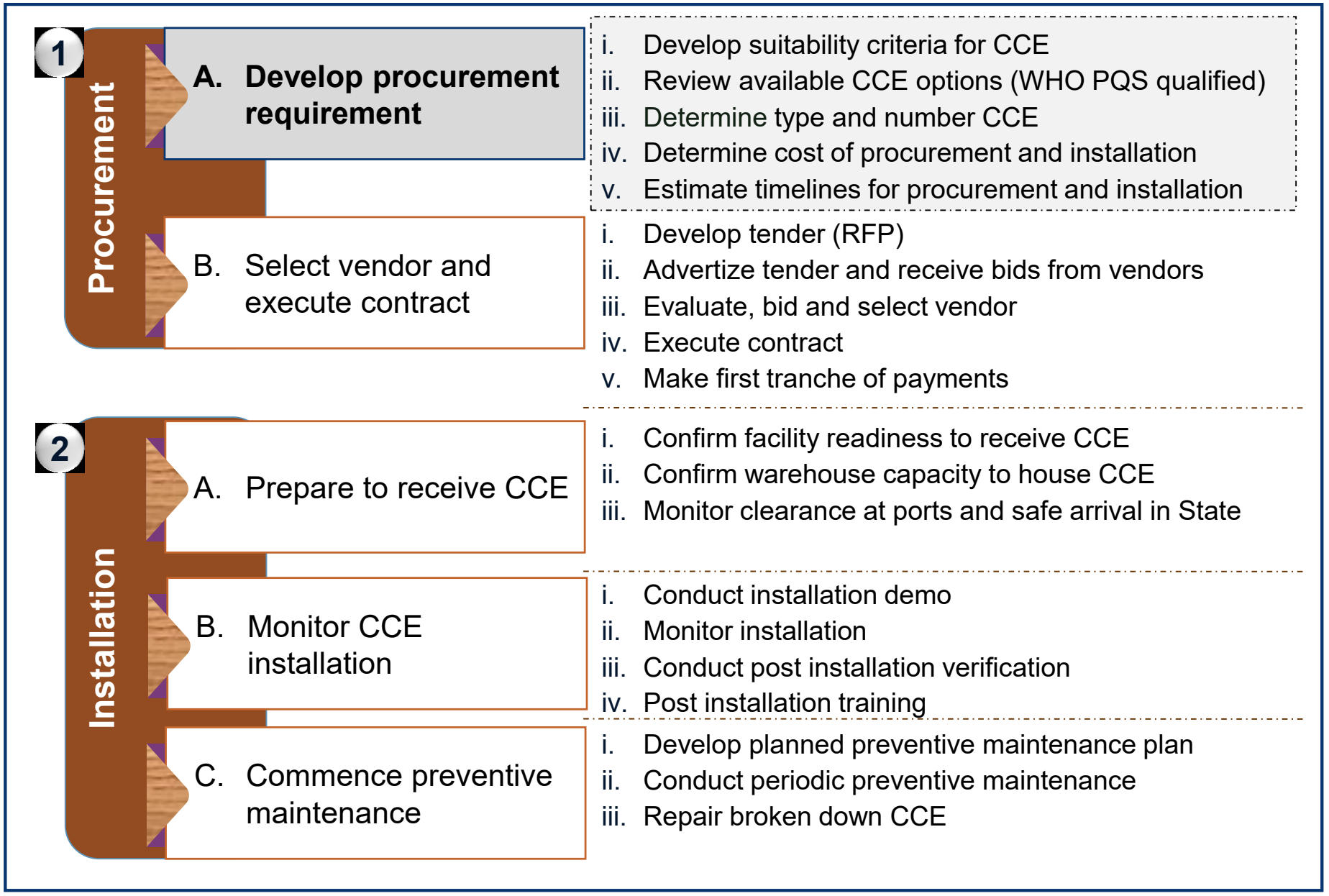
Strengthening Nigeria's Vaccines Supply Chain

CCE Procurement & Installation Guidebook

SCIDaR
SOLINA CENTRE FOR INTERNATIONAL DEVELOPMENT AND RESEARCH

Framework for CCE procurement and installation



3 main factors need to be considered in streamlining CCE options for cold stores or health facilities

Factors		Components
1 Specification suitability		▪ WHO PQS pre-qualification ▪ Suitable CCE technology (e.g. solar direct drive) ▪ Volume capacity suitability ▪ Rated to function at temperatures of up to 32/43°C ▪ Freezer compartment available for ice making[1]
2 Sustainability		▪ Operational reliability of unit (Tried and tested in similar settings) ▪ Availability of maintenance support ▪ Ease of use by end-user ▪ Standardization of units
3 Cost		▪ Purchase and distribution cost ▪ Ongoing maintenance cost

Components of the various factors will need to be updated based on existing realities at time of procurement

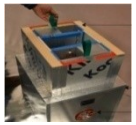
WHO PQS certification is a core requirement for all CCE to be procured for immunization service delivery

The PQS catalogue includes details of all immunization-related products currently pre-qualified by WHO for procurement by United Nations agencies and Governments

The catalogue is divided by category as follows:

- **E001: Cold rooms, freezer rooms**
- E002: Transport (guideline only);
- **E003: Refrigerators and freezers;**
- **E004: Insulated containers (passive devices);**
- E005: Ice-packs, cool-packs and warm-packs;
- E006: Temperature monitoring devices;
- E007: Cold chain accessories;
- E008: Single-use injection devices;
- E009: (not currently used);
- E010: Waste management equipment;
- E011: Specimen collection equipment;
- E012: (not currently used);
- E013: Therapeutic injection devices.

There are equipment options across each of the volume segments…

Capacity range	Technology options	Performance benefits	Examples of manufacturers
10,000 – 40,000 Liters	Cold rooms and freezer rooms	▪ **Grid powered** equipment ▪ Extensive storage capacity ▪ **No-freeze solution**	   Porkka Zhendre Haier
26-100 Liters	SDD	▪ Solar direct drive stores energy thermally, **does not require a battery** ▪ **No-freeze solution** using geometry or advanced phase change material	   SunDanzer Dometic SUNCHILL
>100 Liters	Ice-lined refrigerator (ILR)	▪ **Grid powered**; can operate on 8 hrs. of daily electricity ▪ **Extended holdover** (e.g., >7 days) ▪ **No-freeze solution** using geometry	   SUNCHILL VESTFROST Haier
0- 26 Liters	Thermoelectric chip	▪ Solar powered thermoelectric chip provides cooling, **does not require a battery** ▪ Suitable for **small devices <15L**	  LIGTT globalgood
	Small passive	▪ Well insulated devices require ice, **no active cooling** needed ▪ **>30 day holdover** can be achieved ▪ Suitable for **small devices <10L**	   globalgood SUNCHILL savsu

SOURCE: PQS; Interviews

Aiii 3 options of WHO PQS qualified Walk In Cold Rooms are currently available

STATE X PROCUREMENT EXAMPLE

Make	Capacity Fridge	Capacity Freezer	Surge protector	Voltage regulator	Warranty	Estimated Cost
Porkka Finland 	10k – 40k Litres	10k – 40k Litres	✓	✓	✓ 1 year	$ xx
Zhendre 	10k – 40k Litres	10k – 40k Litres	✓	✗	✓ 1 year	$ xx
Haier 	Up to 40k Litres	20k Litres	✗	✗	✗	$ xx

SOURCE: WHO-PQS Catalog, Information from vendors

There is a wide range of refrigerator technology to choose from

Absorption Refrigerator

- Runs on Electricity or alternative fuel (typically Gas or Kerosene)
- Heat source evaporates refrigerant, removing heat from interior of fridge

Traditional Ice-Lined Refrigerator (ILR)

- Ice lining provides extended holdover during power outage
- Vaccines placed outside recommended storage are risk freeze damage

Next generation ILR / SDD

- Innovative lining / phase change materials eliminate freeze risk
- 7+ day holdover time
- Available in electric and solar powered versions

Global Good P6

- Small devices with very long holdover time (30+ days)
- Requires replacement of ice packs to maintain temperature

Traditional technologies (pre-2010) | **Emerging technologies** | **New technologies (2014+)**

Traditional (non-ILR) Electric

- Domestic fridge – typically used more in middle income countries

Solar fridge with battery

- Fridge with solar-powered battery
- High upfront cost, and battery adds complexity
- Largely superseded by Solar Direct Drive

Solar Direct Drive

- Solar powered without need for backup battery
- Very low operating cost, but high upfront cost for fridge and solar panels
- No freezer in PQS models

Domestic retrofit

- Improves voltage regulation and temperature control
- Can be fitted to low-cost domestic fridges during / post- manufacturing

Alternative smaller devices

- Other innovative smaller devices with active or passive cooling (e.g., True Energy, LIGTT)

SOURCE: PQS; Interviews

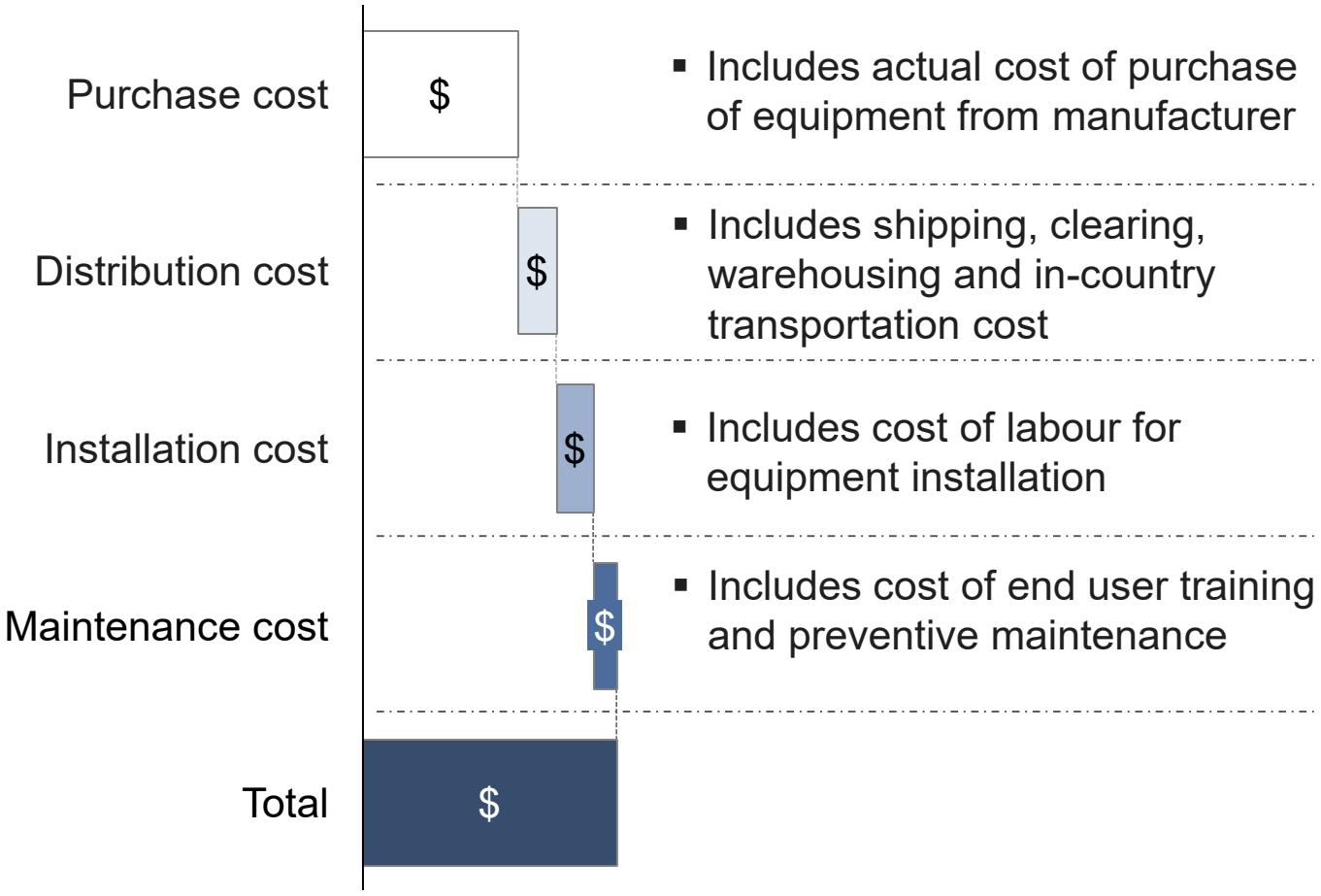
A number of WHO-PQS SDDs and few newer type equipment are available

Category	Make	Model	Capacity Litres	WHO-PQS certification Celsius	Estimated price USD	Comments
WHO-PQS SDD fridge	Dometic	TCW -3000	156	32	5,540	▪ Pre qualified 25 June 2012
	dulas	VC200DD	132	43	5,168	▪ Pre qualified 13 March 2014
	Dometic	TCW-2000	99	32	9,693	▪ It's a dual compartment; pre qualified 14 Dec 2010
	ZERO APPLIANCES	ZLF100DC	99	43	3,799	▪ No compartments
	Dometic	TCW-2043	70	43	4,984	▪ Includes freezer; qualified March 2014
	VESTFROST	VLS-054	55.5	43	2,033	▪ Pre qualified 1 May 2014
	Dometic	TCW40SDD	36	43	5,416	▪ Includes freezer; qualified March 2014
	SunDanzer	BFRV	15	43	2,150	▪ Qualified March 2014
Passive cooler	globalgood	P6	5	43[1]	900-1,300	▪ PQS qualification expected June 2014

SOURCE: WHO-PQS Catalog June, 2014

Total CCE procurement cost is typically made up of purchase, distribution, installation and maintenance cost

Estimated cost of ownership in the first year



Best practice is to include all costs including equipment maintenance for a fixed term on the procurement contract

SOURCE: Team experience

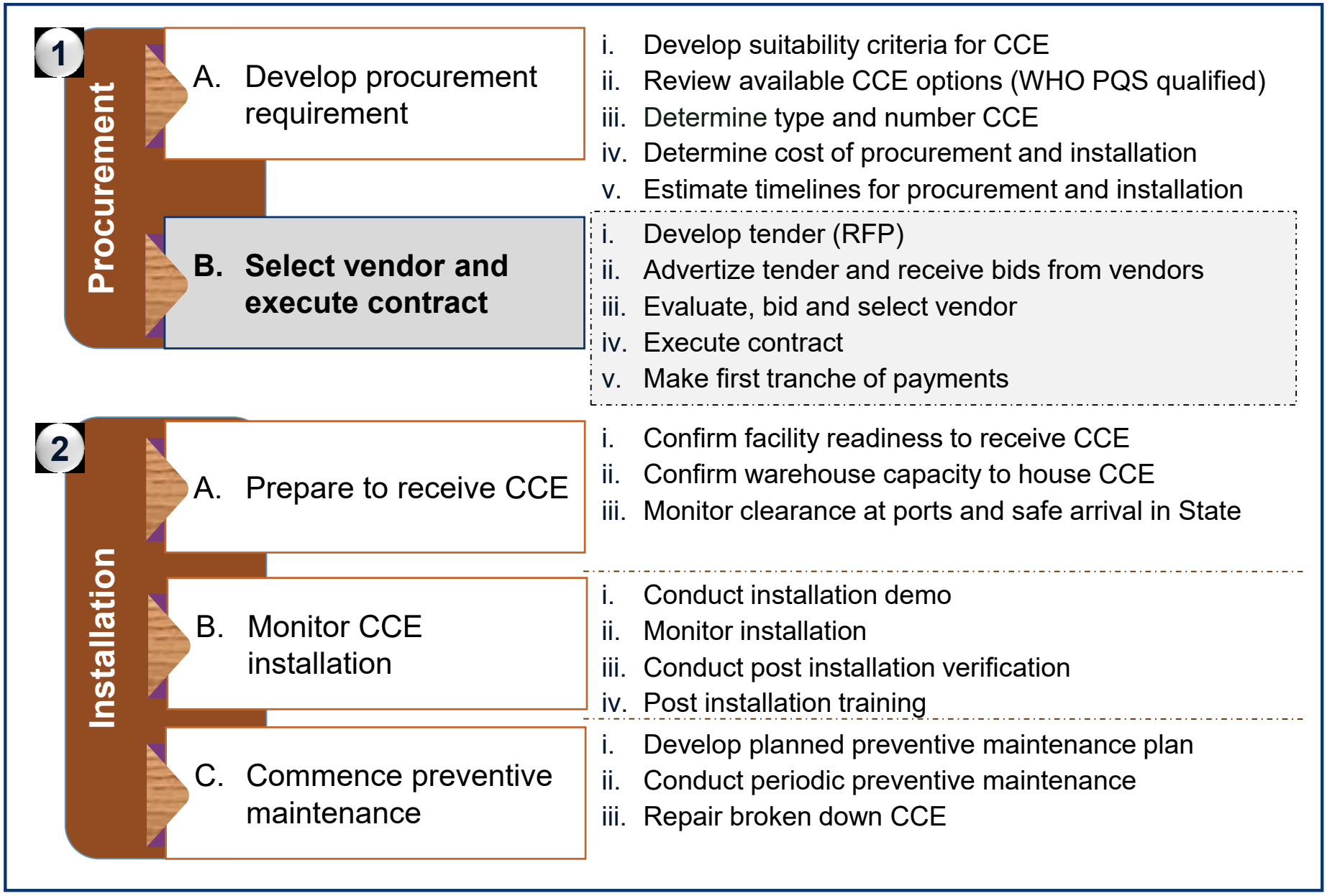
Approximately 24 - 28 weeks[1] will be required to procure and install CCE

	Activities	Estimated duration
1 **Procurement**	▪ Issue RFPs vendors for procurement of CCE	▪ 1 week
	▪ Receive bids from vendors	▪ 2 weeks
	▪ Conduct technical evaluation of bids	▪ 2 week
	▪ Select preferred vendor and finalize contract	▪ 2 weeks
2 **Transportation**	▪ Production and shipping of CCE[2]	▪ 8 weeks
	▪ Clearance of CCE on arrival at port	▪ 3 weeks
	▪ Transportation from port to State and to facilities/store	▪ 2 weeks
3 **Installation**	▪ State wide pre-installation assessment of facilities in wards[3]	▪ 2 - 4 weeks
	▪ Monitor CCE installation and on-site training at selected facilities or cold stores	▪ 2 - 4 weeks
	▪ Post-installation assessment of installed CCEs	▪ 2 - 4 weeks
	Total =	**24 - 28 weeks**

1 Timeline estimate applies from when funds are available for procurement
2. Not included in total estimated duration

SOURCE: Team experience

Framework for CCE procurement and installation



Bi A request for proposal is issued to prospective CCE vendors to kick off the procurement process

Sections of Request For Proposal

	Description	Contents
A Scope of Work	A summary of the background and objectives of the procurement	▪ Objectives of procurement ▪ Responsibilities of vendor ▪ Delivery timelines
B Tendering Guidelines	A complete description of the entire tender process with details of bidding requirements	▪ Pre-requisites for bid submission ▪ Bidding process and procedures ▪ Contents of technical proposal ▪ Contents of cost proposals ▪ Bid evaluation criteria
C Bid Forms &Templates	A collection of forms and templates to be completed by vendors and included in proposals	▪ Cover letter template ▪ Company information form ▪ Relevant experience form ▪ Financial capability statement ▪ Project undertaking form

Proposals are submitted in 2 envelopes

- Technical proposal
- Cost proposal

Attachments

- Sample RFP for procurement of WICR Appendix 2
- RFP for procurement of Solar refrigerator Appendix 3
- List and contact details of NPHCDA recommended CCE vendors Appendix 4

SOURCE: State X bidding experience

Biii The bid evaluation process involves assessment and scoring of a number of key criteria

Key criteria	Points
1. Timelines and completeness of RFP submission	10
– Timely submission of RFP	-5
– Completion and accuracy of submission of RFP contracts	-5
2. Technical and operational capabilities	40
– Demonstrated year of experience (not less than 3 years)	-10
– Appropriateness of fleet (vehicles, equipment, insurance, etc.)	-10
– Quick control plan (avoidance of damages temp. control)	-10
– HR capabilities	-5
– Route optimization plan	-5
3. Costing of the bid and financial strength of the company	40
– Financial robustness and strength of the company (3-year statements)	-15
– Total cost within state budget of services for duration of pilot	-20
– Potential for cost savings based on plan to improve efficiency	-5
4. Innovation, technology and capacity building	10
– Unique innovation to improve quality of service delivery	-4
– Use of appropriate technology	-4
– Plan to build capacity of SPHCDA/MB staff	-2
Total	**100**

- Each distributor will be **evaluated and scored, with clear justification** for each criterion
- **SLWG** will conduct the evaluation and make the final selection
- **Technical proposals will be evaluated and ranked first** prior to the evaluation of the cost proposals.
- Should the **technical proposal not meet the minimum** requirements, their **cost proposal shall not be considered**

A procurement contract is executed with the selected vendor or product manufacturer to deliver CCE

Key Components of CCE Procurement Contract

- **Term:** Contract commencement and duration
- **Product Guarantee:** Vendor's guarantee of performance of product within specified parameters
- **Distribution Schedule:** Timelines from clearance at port to installation
- **Installation requirements:** As stipulated by manufacturer
- **Warranty:** Should include PPM for at least the first one year
- **Training:** To cover maintenance technicians and end users
- **Pricing:** Should include production, shipping, installation and training costs and exclude tax, VATs and import duty
- **Payment Terms:** Payment should be split into 3 tranches: *mobilization*; *on shipment*; and *at commissioning*
- **Duty waivers:** State to obtain National CCE duty waivers for vendor
- **Description of Goods:** As stipulated by product manual

Penalties (which may include imposition of liquidated charges) for delays in delivery may also be included on the contract

Sample CCE procurement contract
Appendix 5, 6

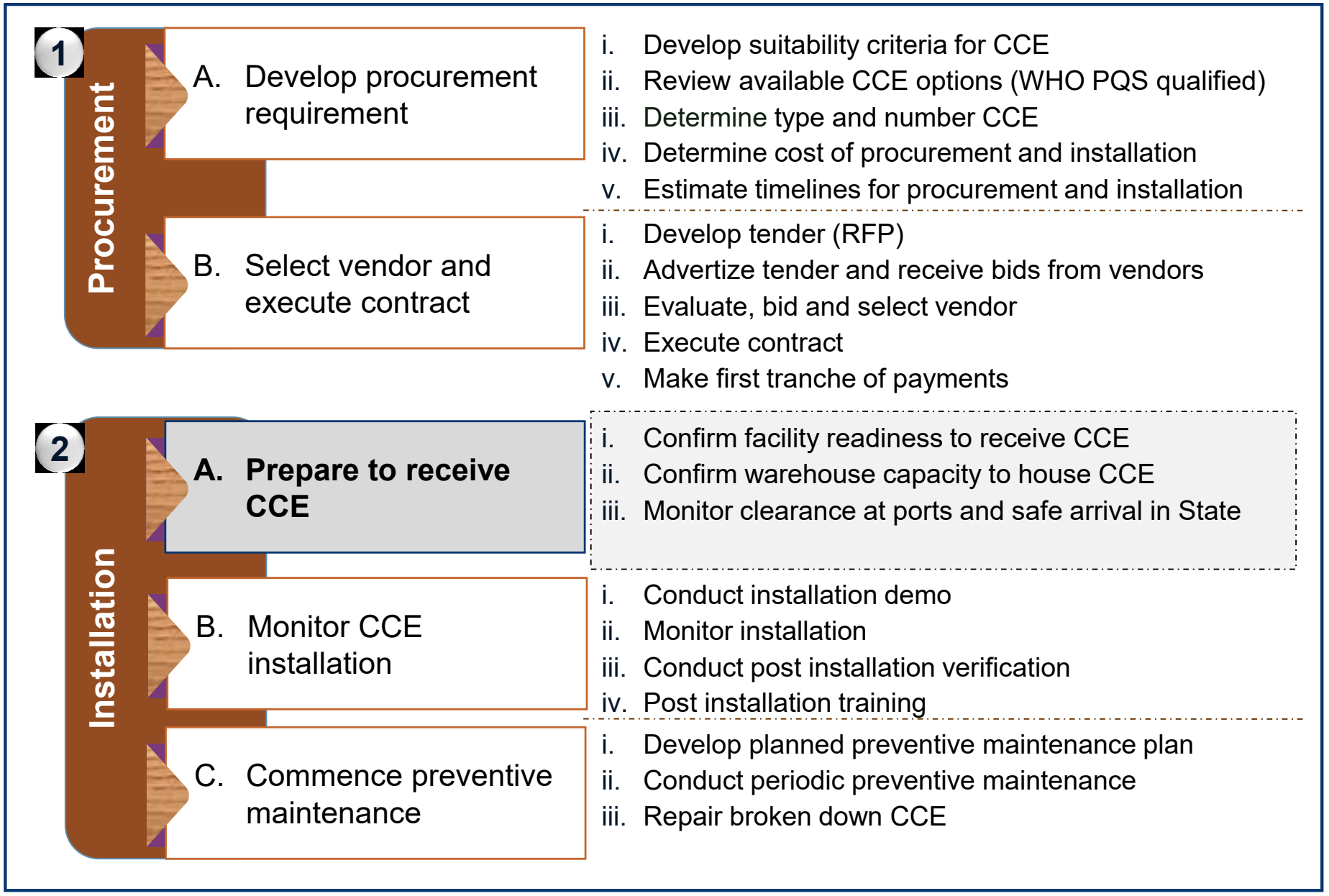
SOURCE: WHO PQS

Sample procurement tracking report

STATE X PROCUREMENT EXAMPLE

	# of vendors	Activity	Due date	Comments/Next steps
Issue of RFP	▪ 9	▪ SLWG issued RFP to 9 vendors for the procurement and installation of five 10m^3 WICRs	▪ Completed	▪ SLWG to answer questions raised by vendors ▪ Vendors to submit bids before deadline
Submission of bids	▪ XX	▪ SLWG to receive bids from vendors who were issued RFP	▪ April 21st	▪ SLWG to invite vendors who submitted bids to the bids opening event
Opening of received bids	▪ XX	▪ Bids of vendors received by SLWG are opened	▪ April 24th	▪ Conduct technical evaluation of bids and select vendor
Selection of vendor	▪ 1	▪ SLWG will recommend vendor for procurement, installation and maintenance of WICRs	▪ April 30th	▪ ES to inform selected vendor of award of contract
Award announcement and finalization of contract				

Framework for CCE procurement and installation



A few steps are required to develop a distribution list of health facilities/wards to receive CCE[1]

Steps	Activities
Identify CCE gaps at health facility/ ward level	▪ Analyze current CCE inventory[2] to confirm distribution of CCE ▪ Identify health facilities with CCE and their respective wards ▪ Identify ward without any CCE ▪ Identify existing health facilities offering RI within the wards
Assess health facilities for suitability to house CCE	▪ Conduct facility assessment to: - Identify facilities fit to house CCE - Determine infrastructural upgrade needs for facilities unfit to house CCE ▪ Carry out necessary repairs for facilities requiring upgrades
Finalize facility distribution list for procured CCE	▪ Verify infrastructural upgrades to relevant facilities ▪ Compile finale list of health facilities to receive CCE ▪ Submit finalized to vendor for distribution

Site Assessment Checklist

Includes basic information on:

- Condition of roof
- Condition of doors and windows
- Adequacy of security (burglary proof and security guard)
- Facility GPS coordinates
- Name and phone number of facility in-charge

Sample facility assessment checklist Appendix 7

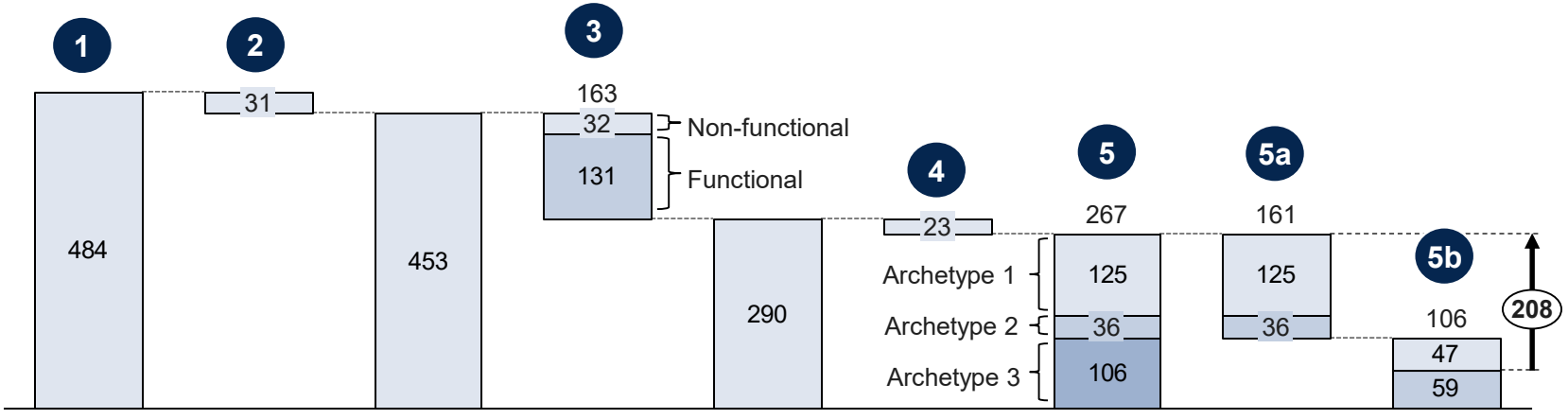
1 National target is to have at least one CCE per ward
2. Current year's CCE inventory should be used wherever possible

The approach to selection of wards/facilities to receive state procured CCE in State X involved 5 main steps

STATE X PROCUREMENT EXAMPLE

1. Started with a comprehensive list of wards in State X;[1]
2. Less wards in where facilities were not accessed by SLWG;[1]
3. Less wards with facilities currently equipped with CCE;[1]
4. Less unequipped wards scheduled to receive CCE;[2]
5. We then categorized the rest of the wards/facilities with no CCE into three categories:[3]
   - Archetype 1: Can receive CCE immediately
   - Archetype 2: Can receive CCE following minor repairs
   - Archetype 3: Will require renovation to house CCE or need to be replaced with another facility

Number of wards/facilities



SOURCE: [1] SPHCDA/MB cold chain site assessment, Dec 2013, [2] List of equipped facilities in State X 2013, [3] Team analysis

A detailed assessment of proposed cold store sites to house WICR will be required to evaluate the infrastructural upgrade needs

Key areas covered by inspection checklist

1 Physical Infrastructure

- What is the size of the store in cubic meters?
- If store is inadequate, are there potential sites that can be adapted for this purpose?
- Are the roof and ceiling in good condition without leaks?
- Are the windows and doors in good condition with locks
- Are the floors in good condition leveled without rising damp?

2 Other Considerations

- Is the area accessible by road and close to relevant transport links?
- Is there adequate parking space for vehicles?
- Is the site secured and properly monitored?
- Is the site well situated conveniently for permanent and supervisory staff?
- Is there reliable electricity or reliable back up power (e.g. standby generator)?

Sample checklist for selecting site for satellite store Appendix 8

A preliminary inspection of proposed satellite store sites will be followed by a detailed assessment of sites and costing of required infrastructural upgrades

SOURCE: Team analysis

A few steps are required to ensure safe arrival of CCE in state

x Weeks before arrival

- Make comprehensive **list of all CCE** expected, including arrival dates and key contacts
- Assess any **additional security** items that may be required for CCE upon installation (e.g., locks, bolts, etc.) and communicate with provider
- Develop **preventative maintenance** plan

- Establish volumes of CCE arriving and find sufficient **storage space**
- Identify **transport plan** for moving CCE from port to warehouse

- On arrival, make careful **check of quantities** arriving
- Conduct random check to assess quality of goods
  - Any damage
  - All parts included

6 — 5 — 4 — 2 — 0

- Assess **customs and clearance** requirements for CCE, and assist with paperwork where possible

- Conduct ongoing checks to ensure transport to state occurring smoothly

Key KPI: % arrived

The Dometic CCE should be stored in warehouse(s) on arrival at State X

STATE X PROCUREMENT EXAMPLE

State Primary Health Care Warehouse

Inside the main warehouse

Reception Bay

High walled fence

General Information

- The warehouse is owned by the SMoH, located in the outskirts of X LGA and is mostly un-occupied
- It has empty containers in its premises which can be used to store CCE
- Validation of items are done in the reception bay before being transferred to the main ware house
- The ware house is managed by the state committee on distribution of medical equipment

Volume Capacity

- It has 2 sections; 1. The main warehouse and 2. The reception bay
- **Warehouse dimension:**
  -Length: 74 ft
  -Breadth: 40 ft
  -Height: 36 ft

  106,560 cubic ft
- **Reception bay dimension:**
  -Length: 74 ft
  -Breadth: 46 ft
  -Height: 15 ft

  51,060 cubic ft

Security

- Security at the warehouse is funded by both the SMOH and a partner organization, with each providing 4 guards (total of 8 guards)
- The security guards work in shifts; 3 for day shifts and another 3 for night shifts with one supervisor and a shift rotating guard
- The ware house premises is covered by a 15 feet high fenced wall with barbed wires
- The warehouse is located close to a police station . The anti-crime team of the police station patrol the community every night
- The security guards have the phone contact of the police patrol team to communicate them in case of theft of equipment or robbery

The warehouse has sufficient storage capacity to accommodate all 208 fridges and solar panels

STATE X PROCUREMENT EXAMPLE

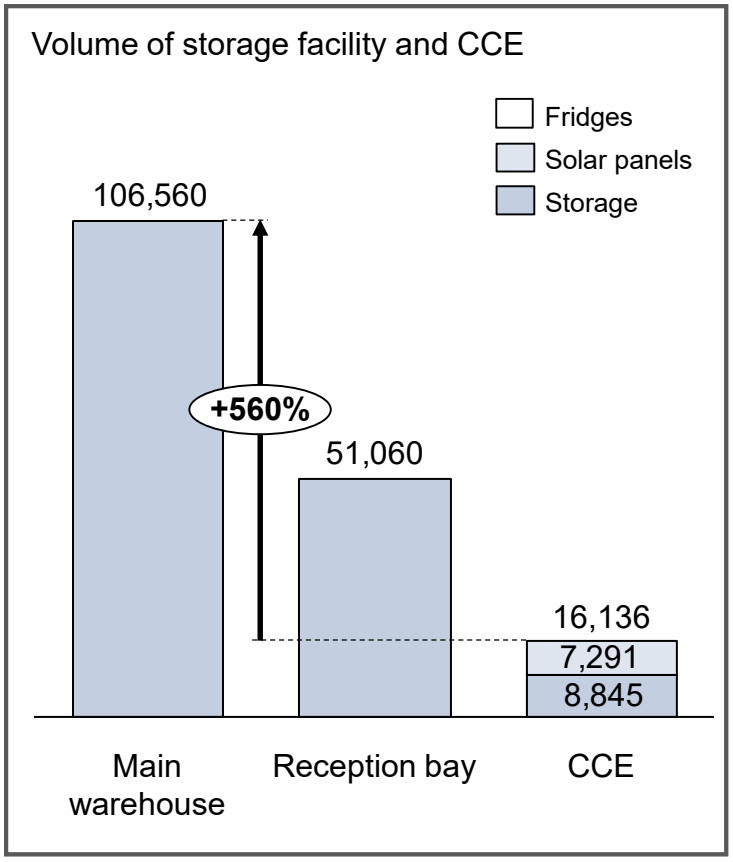
Domestic TCW 2000 SDD refrigerator & solar panel

Dimensions of Dometic TW 2000 SDD fridge *(1 unit in box)*

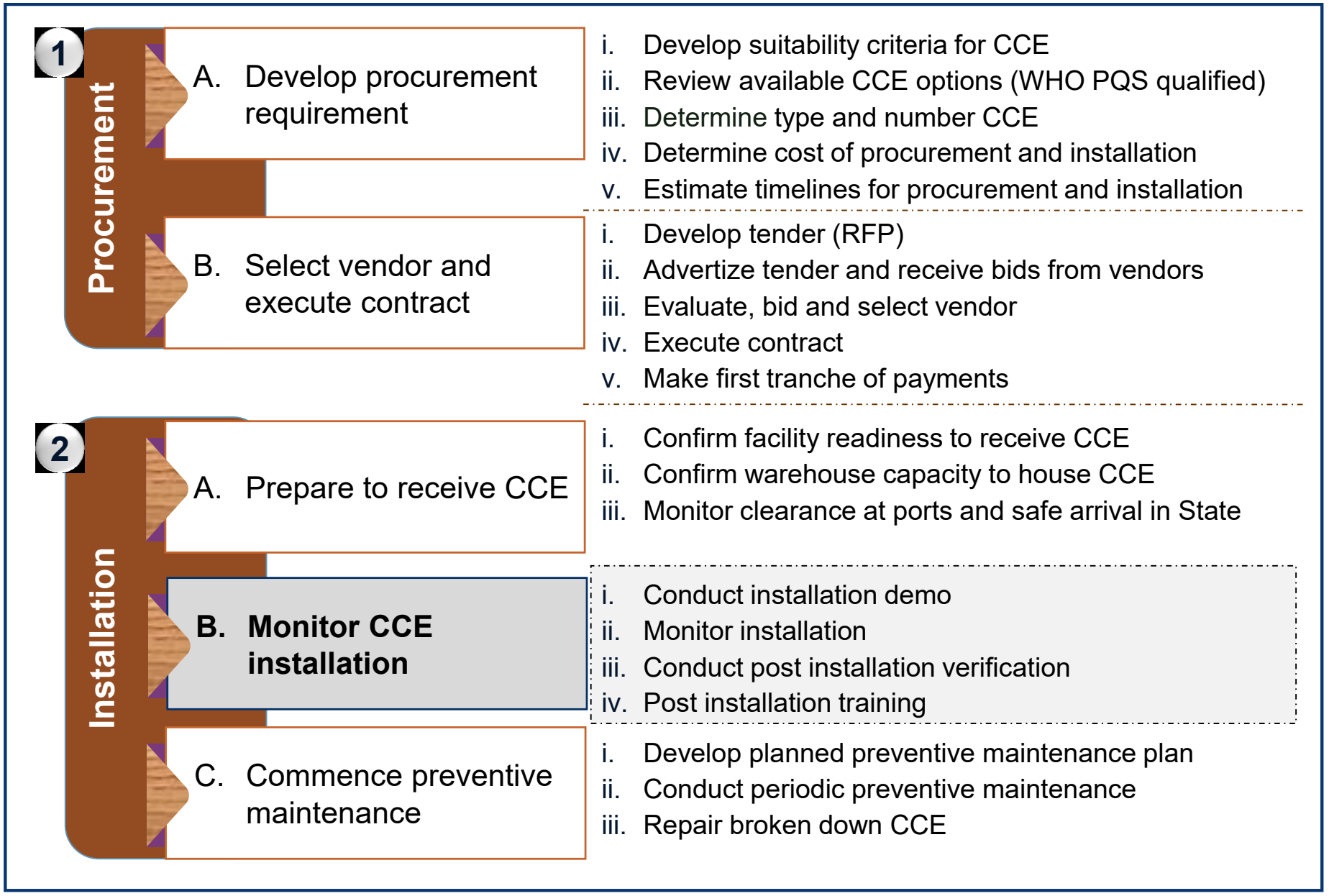
- Length: 4.26 ft
- Breadth: 2.95 ft
- Height: 3.378 ft
- Volume: 42.5 cubic ft
- Volume (x 208): **8,845 cubic ft**

Dimensions of Solar panel *(1 unit in box)*

- Length: 4.23 ft
- Breadth: 2.30 ft
- Height: 3.608 ft
- Volume: 35.1 cubic ft
- Volume (x 208): **7,291 cubic ft**



Framework for CCE procurement and installation



B Proactive steps need to be taken to ensure effective installation of CCE

x Weeks before installation

6 weeks before installation

- Review **list of facilities** to be included and assess if still accurate
- Understand if **installation is included** in provider package, and if not organise technicians
- Develop MOUs that will be signed by the facility and the WDC to formalise **community safeguarding** of the CCE

Sample MOU with facility and community for CCE safeguarding Appendix 9

4 weeks before installation

- Reach out to **senior persons** in LGA to ensure program is well understood
- Contact **LGA CCOs** to introduce them to program
- Inform **facilities** they have been selected
- Conduct **pre-installation assessment** of facilities
- Organise transporter for moving the CCE from warehouse to facilities installation dates

3 weeks before installation

- Conduct any **repairs** required at facilities
- Identify **staff** from within the state who will attend installation activities and be responsible for monitoring completion (see back up for a list of tasks for the **state monitors)**
- Work with clinics to identify **community members** who will sign the MOU and act as 'safety guards' for the CCE

2 weeks before installation

- **Hold a demonstration** of installation for key LGA staff, to familiarise them with new product

1 week before installation

- Ensure all required personnel will be present at installation, including
  - State staff
  - LGA staff
  - PHC staff
  - Community members who will sign the MOU

B Close monitoring at installation and immediately post installation is critical

- Installation must be conducted according to **the SOP**
- Laminated pictorial **end-user guide** must be placed on each fridge to aid end-user understand basic routine maintenance
- Installation team must conduct basic training at time of installation in maintenance
- **Community members** must sign the MOU
- State staff must **monitor and record** all installation activities, and leave site with Proof of Delivery document signed off by Facility I/C, GPS coordinates of facilities, and photos of CCE installation

- Monitoring staff should check CCE functionality **72 hours after** installation, and ensure all problems are resolved, and that the following are on site
  - Product manual
  - Installation manual
  - Maintenance training manual
  - Laminated user guide
- Post –installation visits should be conducted to selected facilities, to **monitor introductions** and give support if any issues arrive
- Post-installation checklist should be completed at visit
- **Post-installation training** should also be conducted for cold chain officers in state and LGA 3-5 days after installation
- A longer term check of CCE temperatures could also be conducted

Post-installation assessment checklist Appendix 10

In preparation for CCE rollout, State X held a demonstration to display standard installation practice and answer questions

STATE X PROCUREMENT EXAMPLE

	Description
Installation procedure	▪ Private firm conducted a step by step demonstration of the installation of the Dometic TCW 2000 SDD
Basic equipment maintenance	▪ Firm educated participants on basic equipment operation and maintenance for optimal performance
Q & A	▪ Session was very interactive and participants received responses to their questions and sought clarification when required
In attendance	▪ **State X** – SIO – SCCO – DSIO – Zonal CCOs – LIOs – LGA CCOs ▪ **Others** – NPHCDA rep – Northwest zonal office rep – Dangote foundation – SLWG members

SOURCE: Installation demo at X PHC, 19th February

Check list of State installation monitor activities

1. Ensure 3 copies of the MoU and any installation check list are signed at each facility
2. Ensure a copy of the signed MoUs are filed with the facility, LGA and state
3. Conduct 72hrs post installation check on installed CCEs and flag any issues (Fridge temp 5degrees, freezer -25 degrees centigrade)
4. Ensure uninstalled CCEs (SDD refrigerator and solar pannels) are taken to LGA store house for saftey
5. Physically verify security guards at sites where CCEs have been installed (include details of name / contact of WDC chairman)
6. Check in daily on progress with SLWG during installation
7. Ensure pictures are taken for facilities, installed SDD, signing of documents, security guards, etc.

SOURCE: Team analysis

EXAMPLE: Installation tracker template

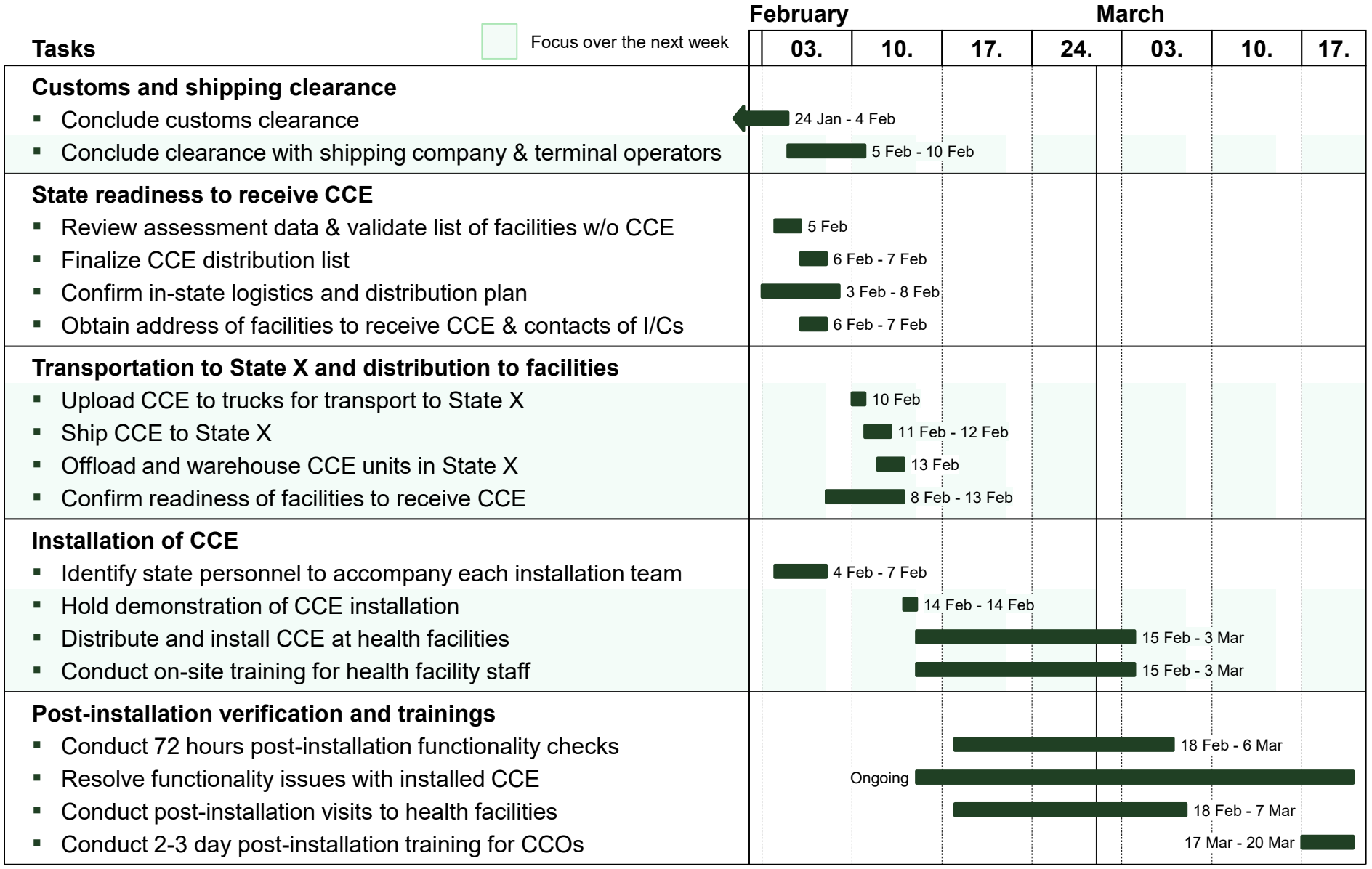
S/No	LGA	Ward	Facility name	Name of health facility in charge	GPS_Latitu	GPS__Longi	Date of installation	Successfully installed?	Signed MoU and sign-off checklist	Verified security guard
1	LGA 1	XXX	XXX	XXX	15.015209	2.516247	19/02/2019	Yes	Yes	Yes
2	LGA 2	XXX	XXX	XXX	15.007745	2.513586	24/02/2019	No	Yes	Yes
3	LGA 3	XXX	XXX	XXX	15.989653	2.51919	24/02/2019	Yes	Yes	Yes

An Excel spreadsheet should be used to track each activity, and to keep a detailed record of the facilities' involved (including precise location co-ordinates)

Sample installation tracker excel sheet Appendix 11

Work plan for State X CCE procurement, distribution and installation

STATE X PROCUREMENT EXAMPLE



Framework for CCE procurement and installation

1 Procurement

A. Develop procurement requirement

i. Develop suitability criteria for CCE
ii. Review available CCE options (WHO PQS qualified)
iii. Determine type and number CCE
iv. Determine cost of procurement and installation
v. Estimate timelines for procurement and installation

B. Select vendor and execute contract

i. Develop tender (RFP)
ii. Advertize tender and receive bids from vendors
iii. Evaluate, bid and select vendor
iv. Execute contract
v. Make first tranche of payments

2 Installation

A. Prepare to receive CCE

i. Confirm facility readiness to receive CCE
ii. Confirm warehouse capacity to house CCE
iii. Monitor clearance at ports and safe arrival in State

B. Monitor CCE installation

i. Conduct installation demo
ii. Monitor installation
iii. Conduct post installation verification
iv. Post installation training

C. Commence preventive maintenance

i. Develop planned preventive maintenance plan
ii. Conduct periodic preventive maintenance
iii. Repair broken down CCE

C CCE preventive maintenance plan is designed to achieve 2 main objectives through 3 streams of activity

The objectives of the maintenance plan…

- **Minimum downtime**
- **Maximum Lifespan**

… will be achieved through three main streams of activity

1. Dedicated maintenance Unit
2. Up-to-date Floating Assembly
3. Equipment management & inventory replacement plan

C SOPs and guides are required to effectively maintain CCE

	Description	Location	Revision Plan
Maintenance Routines 	▪ An SOP containing routines for periodic maintenance of CCE	▪ On wall above CCE at store or health facility	▪ Revised annually to include information on new models of CCE procured
Response Protocol 	▪ A protocol that guides response to CCE breakdown	▪ On CCO, facility IC, state technicians desk	▪ Revised if State RI team structure changes
Dos and Don'ts 	▪ A detailed list of best practice in operations and maintenance of CCE	▪ On wall above CCE at store or health facility	▪ Revised annually to include information on new models of CCE procured

Appendices

1. WHO PQS devices pre-qualification catalogue June 2014
2. Sample request for proposal for WICR procurement including technical specifications
3. Sample request for proposal for SDD fridge procurement including technical specifications
4. List of NPHCDA recommended CCE vendors
5. Sample WICR procurement contract
6. Sample SDD fridge procurement contract
7. Health facility pre-installation assessment checklist
8. Checklist for choosing site for satellite store
9. Sample MOU with health facility and community for CCE safe guarding
10. Sample post-installation assessment checklist
11. CCE installation tracker spreadsheet

BACK UP

Applying simple filters based on suitability criteria helps streamline options of CCE for procurement

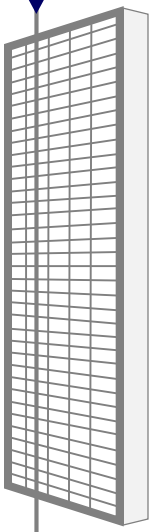
NATIONAL PROCUREMENT EXAMPLE

All WHO-PQS qualified fridges and freezers

- 22 fridges
- 7 fridge/ freezers
- 8 freezers

Dometic, ZERO APPLIANCES, SURE, dulas, Haier, SunDanzer, VESTFROST

1 Solar

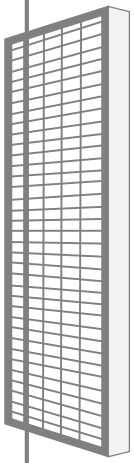


Solar fridges and freezers

- 8 fridges
- 5 fridge/ freezers
- 1 freezer

Dometic, ZERO APPLIANCES, SURECHILL, dulas, Haier, SunDanzer, VESTFROST

2 Rated to 43 degrees

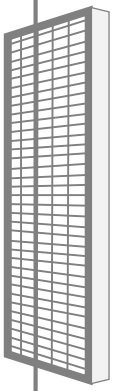


Solar fridges and freezers qualified to 43 degrees

- 4 fridges
- 4 fridge/ freezers
- 1 freezer

Dometic, ZERO APPLIANCES, SURECHILL, dulas, SunDanzer

3 SDD



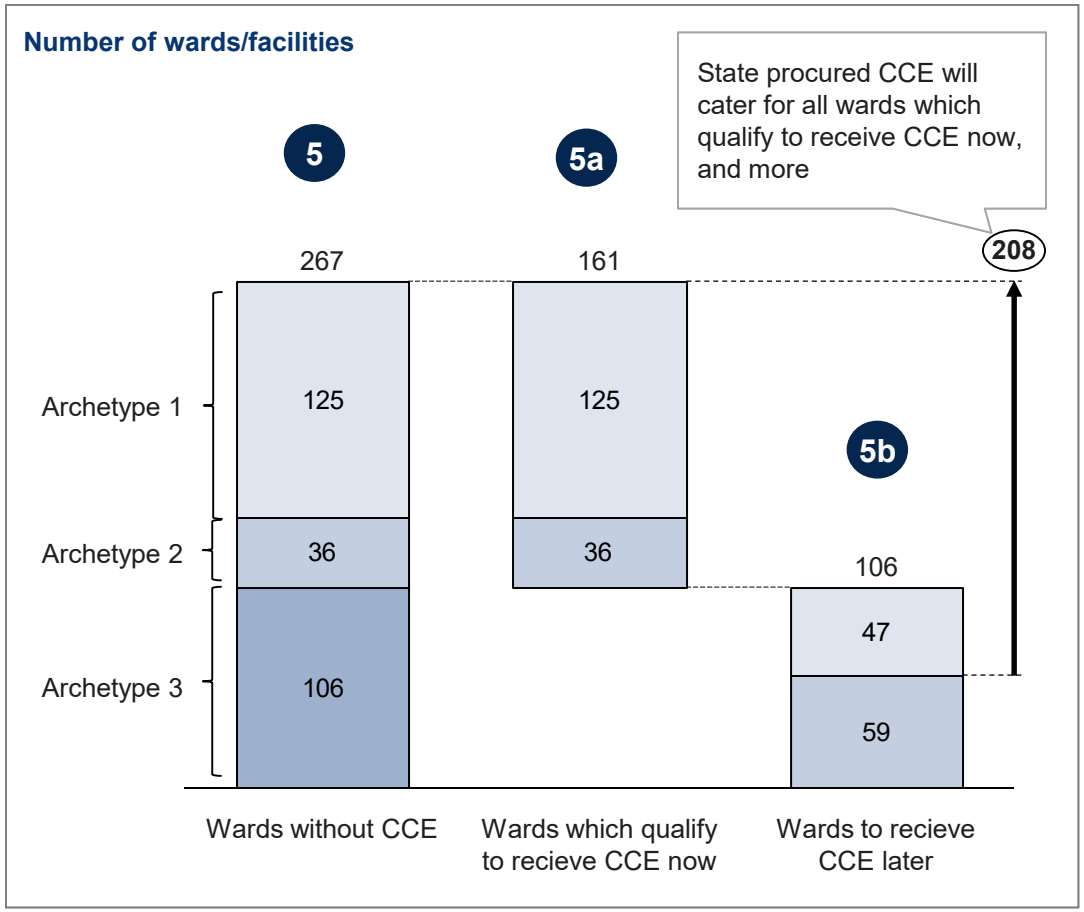
SDD fridges and freezers qualified to 43 degrees

- 4 fridges

Dometic, SURECHILL, SunDanzer, ZERO APPLIANCES

Wards/facilities with no CCE were categorized into 3 archetypes based on the capacity of their present infrastructure to house CCE

STATE X PROCUREMENT EXAMPLE



Archetype	Roofing[1]		Doors & Windows[1]
Archetype 1	Standard	✚	Standard
Archetype 2	Standard	✚	Needs repairs
	Needs repairs	✚	Standard
	Needs repairs	✚	Needs repairs
Archetype 3	Standard/ Needs repairs	✚	Dilapidated
	Dilapidated	✚	Standard/ Needs repairs
	Dilapidated	✚	Dilapidated

- Facilities in archetype 1 & 2 qualify to receive state procured CCE immediately
- Minor repairs will be required before or during CCE installation
- Facilities in archetype 3 will significant renovation or replacement with other facilities

1. Facility roof and doors/windows was graded in 3 categories (standard, needs repairs and dilapidated) based on assessment teams' judgement

SOURCE: SPHCDA/MB cold chain site assessment, Dec 2013