



# Decentralised Sustainable Energy and COVID 19 Immunisation Value Chain

SELCO Foundation



## Vaccine Delivery

Awareness & Registration

Vaccine Delivery

Vaccine Severe Side-effects

## Immunisation Cold Chain

District Hospital  
(ILR + Deep Freezers + Blood Storage + Walk in Cold Storage)

CHC  
(ILR + Deep Freezer+Blood Storage)

PHC  
(ILR + Deep Freezer)

Sub-Center  
(Vaccine Carriers)

## Diagnostics

Vitals  
(Oxygen, Pulse, Blood Pressure, Temperature)

Pathology

Radiology  
(Chest X-Ray and CT Scan)

Specialised  
(Blood Sugar level, C Reactive Protein Test, Arterial Blood Gas Analysis, Kidney function Test, Complete Blood Count (CBC))

# Immunisation Value Chain and Suitable Technologies

# Immunisation Value Chain (Opportunities for Decentralised Sustainable Energy)

## Awareness & Registration

Especially at the last mile for rural and tribal areas where awareness regarding vaccination would be lower.

Audio-visual equipment would awareness building + Supporting infrastructure beneficial for health outreach and other last mile services.

## Vaccine Delivery

Vaccine Delivery from District Levels upto the last mile involves a chain of nodal points. Supply chains would need to be efficiently designed in a manner that transaction costs for health centres and out-of-pocket expenditure for vaccine seekers are as low as possible.

Larger Storage at State District Levels + Appropriate Transportation to sub health centres

Medium sized vaccine storage refrigerators with long hold over periods + Deep Freezers for Ice Packs

Vaccine Carriers + Appropriate last mile healthcare delivery tools like Mobile Medical Units

## Vaccine Severe Side-effects

Vaccine Delivery may have complications and certain measures may need to be taken at the last mile

Emergency care and diagnostics equipment + Appropriate last mile healthcare delivery tools like Mobile Medical Units or Community Centres

Referral Health Facility with adequate therapeutic equipment and access to energy + Emergency transport to the health facility

## Awareness, Registration and Last Mile Health Care Delivery

### Audio-visual equipment would awareness building

#### Projectors/Television

Solar powered, with added content for vaccination awareness, COVID-19 awareness in local languages for tribal and rural communities



## Supporting Infrastructure and Tools for Last Mile Healthcare Delivery



### Community Centers

Solar powered with lights, fans and mobile charging. Refrigerators can be added for last mile storage. Emergency health procedures in remote areas



### Mobile Medical Units

Solar powered with lights, fans and mobile charging. Vaccine carriers or refrigerators for needed vial capacity. Modular and extendable for quality healthcare delivery at the last mile.



### Community Health Worker Kits

Medical kits and portable equipment for last mile diagnosis and administering shots. Vaccine carriers if needed.

# Vaccine Delivery and Cold Chain

## National or State or District Level Vaccine Storage (Various Sizes of Walk in Cold Storage/Walk in Freezers)



- Two types available - Plug in models and split unit models
- Plug in models are prefabricated and provide 100% standby cooling, are easy to assemble and do not require additional connections.
- Split units reduce disturbance and noise pollution however require additional piping and cabling

## Refrigerated and Insulated Vans b/w National, State, District and Health Centers



- Reefer trucks or insulated vans are available in various sizes - Approximately 20 cuM to 32 cuM.
- Insulated vans and reefer trucks available in the intermediate commercial vehicle (ICV) segment and Medium Commercial Vehicle (MCV) segment.
- Insulated vans in the Small Commercial Vehicle (SCV) and Pickup (PU) segment for last mile linkages

## Health Center Level Ice Lined Refrigerators and Deep Freezers



- Especially beneficial in areas with unreliable electricity supply or rely on diesel for power
- Battery-less systems with phase change material to hold vaccines for long periods in the absence of energy supply
- Energy efficient - compressor runs for a limited period (8-10 hours) while vaccines stay cold for 24 hours.

## Vaccine Carriers for Last Mile Delivery



- Maintain required temperatures for upto 12 hours
- Temperature can be continuously monitored to avoid spoilage of vaccines
- Reduces wastage of vaccines
- Helps use human resources effectively reducing the need for repeated immunisation visits to remote areas

## Case Studies

### Solar Powered Vaccine Storage at District Hospitals



Solar powering of larger scale cold storage for vaccines, blood and other needs.

Reduced diesel expenditures and improved quality of healthcare delivery.

### Ice Lined Refrigerators and Deep Freezers at Community and Primary Health Centres



Solar powering of medium scaled solar direct drive vaccine storage units. These have significantly reduced costs from energy expenditures and at the same time reduce wastage of vaccines.

### Vaccine Carriers for Last Mile Delivery with Mobile Medical Units and Community Health Workers



Solar power at nodal centres for charging Phase Change Material based vaccine carriers. Vaccination along with other last mile health-care needs in remote tribal areas are addressed via mobile medical units.

### Vaccine Cold Storage on Boat Clinics for Last Mile Delivery for Islands



Solar power for boat clinics operating in the char areas of Assam's Bhrmaputra River. Boats travel to islands for extended periods of time relying solely on diesel. Solar power for vaccine storage and other staff needs on the boat significantly reduce diesel expenditures, vaccine wastage and transaction costs for delivering health services.