

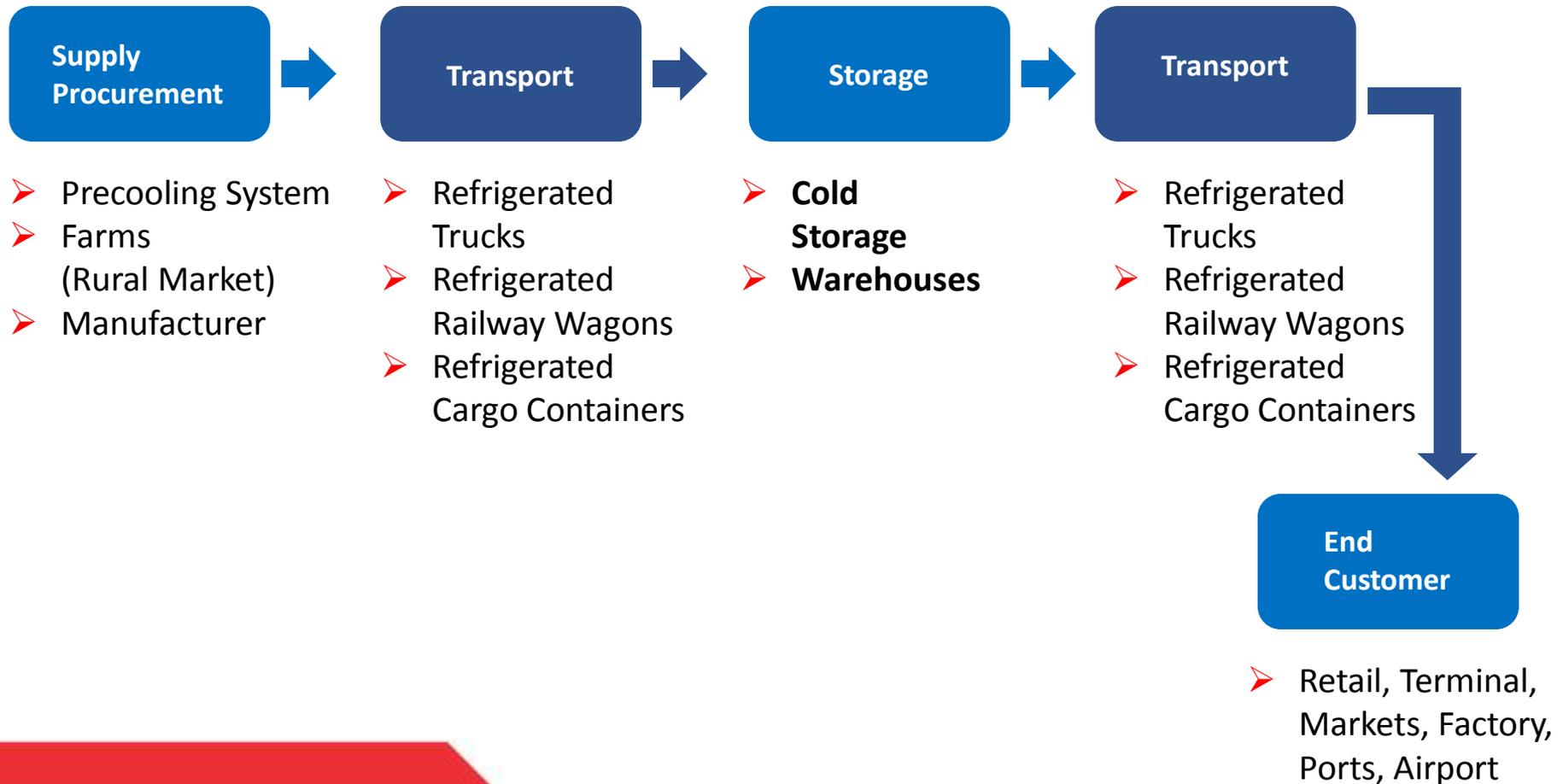


**Advanced Phase Change Materials**

# **Application of Phase Change Materials in Cold Chain Transport**

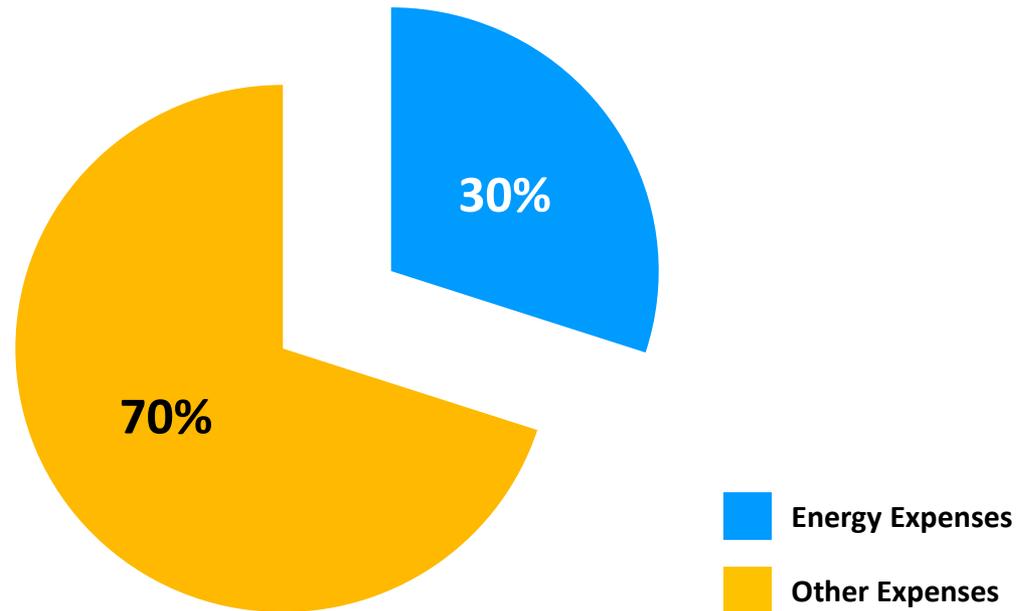
# OVERVIEW

## The cold chain logistics infrastructure



# OVERVIEW

## Temperature controlled transport sector



Source: Cold Chains: The Essential Infrastructure, News desk <http://logisticsweek.com> , 2012

# BOTTLENECKS

## Limitations in controlled temperature transport and storage -

➤ Poor Transport Infrastructure

➤ Fragmented cold storages

➤ Power outages

➤ High capital investment

➤ Awareness & Adaptation of new technology

# INNOVATIONS TO CLOSE THE GAPS - PCMs

➤ Temperatures maintained without external source. -33°C to +89°C

➤ Back-up for temp. critical applications. Up to 96 hours.

➤ Reduces energy consumption, noise and emissions. Uses of peak electricity

➤ Increases Payload. No cooling equipment, doubles as insulation too.

# APPLICATION IN TRUCKS

## PCM Passive Plates

- Charged Offline
- Easily loaded before transport
- Truck can be used for different commodities by replacing the PCM.
- Ideal for 6 – 8 hours of transport



Vehicle : TATA ace trucks, Client: Nestle, in Delhi & Chennai

# APPLICATION IN TRUCKS

## PCM Passive Plates



Vehicle : TATA ace trucks, Product: Dominos Pizza

# APPLICATION IN TRUCKS

## PCM Passive Plates

- Charged Offline or Online
- PCM plates are fixed permanently
- Can be used for long distance transport - 16 hours to 40 hours



Source: PCM based refrigeration truck manufactured by TESSOL Pvt. Ltd.

# APPLICATION IN TRUCKS

## PCM Wrapped Pouches

- Charged Offline or Online
- PCM pouches are wrapped around insulated cabinet
- Back-up for Chilled range – 4 to 5 hours
- Back-up for Frozen range – 10 to 12 hours



# PCMS FOR COLD CHAIN

<b>Product</b>	<b>Operating Temperature (°C)</b>	<b>Latent Heat (KJ/Kg)</b>
HS 33N	-33	250
HS 26N	-26	205
HS 23N	-23	200
HS 10N	-10	220
HS 7N	-7	230
Frost	0	290
HS 22	22	185
FS 65	65	180
FSM 65	65	170