

Cold Chain-21 major bottlenecks

India's logistics sector usually has a limited outlook when projecting into the future. This is largely because of the gap in associated infrastructure and matching processes, thereby never allowing them to be truly ahead of the development curve. Within this sector, what is called the cold-chain has its own unique concerns. In the cold-chain, having complete control on the asset base takes on huge import due to its impact ramification on not just the service integrity but inherently on product's final value realisation.

While the cold-chain has frequently been thought of as a temperature controlled supply chain, it involves total environment control and automatically includes packaging and other accessorial inclusions. Everything the ordinary supply chain hopes to live upto, is intrinsic to cold-chain. Yet, it is a laggard when it comes to India's readiness.

There is robust support from the government aimed at developing an integrated approach to cold-chain, vis the previous start-up phase of setting up base infrastructure. Yet opinions suggest that there is more that needs doing to hasten such development. Where and what, are these moot points? In an attempt to exemplify, the development aspects can be categorised into following sectoral components that are typically required for an effective chain:

Static Infrastructure - as initiators of the cold-chain, and for term based storage, and as cross dock distribution



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Mobile Infrastructure - as links for post production and pre-market stages. These are designed to cater to logistical load factors (small volume transit and long haul transits). Additionally cold-chain extends onto the merchandising infrastructure at the retail point of sale.

Standards & Protocols - as procedural processes for safety, designing, handling and for the operations of a wide array of finished products & raw produce, largely food or health related.

Skilled Resources - human resources to implement all above aspects in a cold-chain.

Let us first understand that any integrated Cold-chain is intended to serve as a link between production centres and market. Cold-chain is not (obviously) solely about preserving and sitting on the goods over extended durations. It is a given, that source and markets exist as do national imperatives in developing effective and sustainable cold-chains.

The success of any cold-chain relies on how efficiently it can serve as a conduit for products that are sensitive to their holding environment (air composition, temperature, microbial load, etc), from the place of origin to their destination with full integrity.

Different products require different controls and practises.

The following are some of the additional initiatives that can be undertaken by the establishment and industry

to ease up bottlenecks to faster implementation.

Static Infrastructure (Cold stores, Pack-house, Pre-coolers)

1. Change of Land Use

CLU from agricultural use to industrial use is required for setting up cold-chain centres and the procedure is long drawn out. While some centres serve as distribution hubs adjoining large density population centres, the initiating centres of cold chain such as pack houses with pre-coolers are mostly intended closer to farm-gate or at source farm level.

Cold-chain intrinsically serves as a marketing supply link for agricultural produce and hence directly impacts sustainability of producer/originator of the chain. Unlike typical industrial enterprises, it involves minimal inorganic effluent and other industrial waste.

The processes and delays in acquiring CLU have a negative impact on the development of cold-chain.

Since cold-chain is affiliated primarily to Agriculture; ie- horticulture, pisciculture, animal husbandry etc, the necessitation of CLU can be dispensed with, especially when setting up farm-gate based facilities.

2. Other Sanctions and Permits

Permits from TCP (Town and Country Planning), Pollution Control Board, Fire Departments, etc are treated at par with other projects.

The lack of a fast-track permit system to specifically for cold-chain infrastructure slows down development initiatives.

Since cold-chain is considered imperative to food security and safety, there should be clear directive to allot priority to processing such permits. This will reduce the delays and help optimise decision making for investors.

3. Financing Options

Banks and other funding institutes do

not provide priority funding to cold-chain projects as industry is considered nascent in meeting its operational challenges. Neither has NABARD been allowed to refinance banks or directly fund private sector entities. NABARD is currently effectively limited to funding operations of State Governments and Government sponsored organisations only.

There are minimal preferential options or interest rates for cold-

chain infrastructure.

Since cold-chain is considered a national priority which impacts across various demographic segments, a definitive initiative by assigning it status of priority lending sector will ease access to promoters and entrepreneurs.

4. Technology Availability

Domestic equipment manufacturers have been scarce and deficient in developing indigenous refrigeration and

Under Finance Act, chapter 5 on service tax defines storage and warehousing to include "services for goods including liquids and gases but does not include any service provided for storage of agricultural produce or any service provided by a cold storage".



associated control systems. As such, most modern industrial equipment and technology is imported from foreign suppliers or their marketing offices in India. These importers store limited inventory in the territory of India (DTA), to avoid cash flow concerns due to domestic tariff implications.

‘Lead time’ delay in sourced equipment adds to the delays in procurement and development.

To hasten development and in alignment with custom duty abatement to cold-chain equipment, such equipment inventory should be allowed within India on an annual or bi-annual basis. This will help speed up projects and also aid in reducing inactive lead times.

5.Regulatory Construal Service Tax

Under Finance Act, chapter 5 on service tax defines storage and warehousing to include “services for goods including liquids and gases but does not include any service provided for storage of agricultural produce or any service provided by a cold storage”.

Yet service tax is applied to services provided at cold storages specially in correlation to definition of agricultural produce. Furthermore, the definition of ‘agricultural produce’ is exclusive to activities intrinsic to the cold-chain.

Effectively, the cold-chain is deprived of perceived benefits, with service tax exemption only being extended to limited single commodity storage, which is contradictory to the agenda of integrated cold-chain development.

Service tax exemption as intended is not fully applied to modern cold-chain services.

Clarity on applicable definitions would bring intent in alignment with implementation. Instead of cold storage, the definition should be amended to cold-chain and allied activities.

6. Regulatory Construal Excise

Government exempts certain cold-storage projects from basic custom duty. Yet, there are various post project equipment and components that are

necessary for optimisation of cold storage operations, namely: energy optimisation and automation systems, data recorders and other sensors. These monitoring components are also used in mobile refrigerated trucks. These components also are subject to rapid technology upgradation and include innovations and inventions that may not have been available during project period.

Custom & Excise duties exemption for cold-chain should be extended to energy monitoring & optimisation gadgets.

Added costs on new technology options detract from utilisation of such systems and induce low intake of new technologies. Furthermore, lack of such systems does not allow scope to reduce energy consumption or alleviate impact to environment from cold-chain infrastructure.

7. Energy

Cold-chain intrinsically requires energy source for maintaining compliance to product specific environmental parameters. Availability of energy is random or minimal at farm-gate or cold-chain initiation level. Back-up systems are generally diesel fuel driven with associated costs. Various previously built storage units require technology upgradation to bring operational viability.

While rising energy cost impacts all aspects of modern living, for cold-chain specific development, policy focus on R&D and promoting the use of alternate energy technology is required. Systems that use magnetic levitation, salt-based cooling, solar thermal energy banks as well as intelligent energy monitors need investigation and promotion.

Acute energy dependency impacts cold-chain development.

The failure of cold-chain intrinsically affects waste across the entire value chain. Priority intervention to assure low cost or long term power source as national developmental strategy is required.

8. Others

Cold-chain development efforts were earlier largely focussed on building storage capacity basis hypothesis of cross seasonal carry through of produce. This resulted in large single commodity bulk storage development (in discord to India’s land holding backdrop). Being focussed on potatoes, this missed out development of back-end pre-cooling or pack-house. The larger majority of agricultural produce items require farm-gate activities including pre-cooling to initiate a cold-chain conduit to market.

Government enablement policies through subsidy schemes allowed for development of cold storages in isolation. As a result of such subsidy policies, cold storages developed in clusters, irrespective of business model validation or of demand gap viability in the locations considered. Example, excess capacity developed in certain regions for potato resulting in failed potato cold storages in those areas. Cold storages were developed irrespective of any integration agenda.

Lack of business intelligence parameters affected development trends.

Future support mechanisms by the government must not be deemed sufficient by just easing capital investment requirements. Such monies are better expended by supporting assessment through need gap analysis.

Mobile Infrastructure (Reefer Vans/ Trucks, Carriers, Merchandising carts)

9. Availability

Cold-chain is ineffective without temperature controlled distribution connectivity between source point and market. Whilst we notionally have ~31 mill MT of cold storage infrastructure, the capacity in reefer transport is estimated at ~7000 vehicles . At an average of 10MT per vehicle with estimated turn-around of 1 week, this fleet translates into 3.6 mill MT only, or transport availability for only 12-15% of storage capacity.



Lack of reefer transport deters development of cold-chain.

Special focus on development of reefer vehicles is required. All other development will come to naught if all important connectivity between origin and destination is missing.

10. Supply

Reefer trucks are typically not sold off the shelf as in case of other vehicles. Very limited OEM manufacturers are supplying fully built refrigerated vehicles.

Normally, the OEM manufacturer supplies the base chassis. The same is retrofitted with its insulated body at a different premise by the insulated body manufacturer. Finally the refrigeration equipment supplier installs and commissions the reefer equipment. This arrangement has procedural, financial, warranty and cost repercussions.

Supply side constraints limit faster growth in reefer vehicle market.

Industry and manufacturers must realise the vacuum and already large truck manufacturers are stepping into this space. A one stop shop with associated warranties will help mend this gap.

11. Financing

Vehicle procurement loans are

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available at low cost or through bank hypothecation route. Yet in case of reefers, the component chassis, insulated body and refrigeration are subject to differing financing norms.

The base chassis is financed at preferential market rates (8-13% interest for 80-100% cost), whereas the cold-chain components (insulated body and refrigeration unit) are financed at higher costs (10-15% interest for only 50-75% of their cost). In effect, a reefer vehicle has a higher cost impact than ordinary commercial vehicles.

There exists a lack of domain understanding amongst financiers..

Despite the existing focus to ease financing options to cold-chain, there instead exists a higher financing cost to reefer vehicles. Priority lending to cold chain must specifically include the

reefer trucks.

12. Procedural Impediment

Reefer vehicles are subject to excise duty exemption. Yet, as they are supplied in disassembled components, the industry is effectively deprived from availing this fiscal benefit in a cost effective manner. Currently Central Excise authorities hold the view that the "Cab Chassis" itself is a finished product and as such cannot be moved for further job work. Hence as per Central Excise Rules, moving the cab-chassis for job work to complete the final reefer vehicle (fitment of cold-chain equipment), is subject to payment of excise duty (14% plus cess).

Alternately, the core utility components - reefer body comprising insulated container and refrigeration unit - are

required to be transported to the truck chassis manufacturer's facility after paying excise duty. Thereafter, the aggregate vehicle is returned to originating plant for final inspection, integration and testing prior delivery. Finally, the tested vehicle has to be returned to the chassis OEM factory to comply with procedural (CENVAT) requirements.

These activities to avail benefit involve extra to/fro transportation. This multiple movement adds to fuel wastage & costs, driver cost, delay in delivery to cold-chain users and increase to non-earning period of the asset owner.

Regulations intended for support, did not account for the production process.

Industry must collectively impress upon the regulators to correct these irritants. Such micro-level amendments escape policy makers until the stakeholders represent them appropriately.

13. National Permits

Reefer trucks are subject to National Permit to travel between states. This permit is applied annually and is typically not issued after eighth year; thereafter the vehicles are allowed to move intra-state only.

While some other commercial utility vehicles can be issued permits for larger periods of upto 25 years, there is no specific consideration or rules for reefer vehicles under MVA 1988. Reefer vehicles also subject to colour coding for ordinary vehicles – a dark brown shade is required to move interstate.

An important resource for cold-chain development thereby faces blanket generic restriction to its area of operation after its eighth year, and this raises cost of the utility.

Regulations limit the operating and earning life of Reefer vehicles.

If cold-chain is to be accorded priority, Reefer trucks must get specifically licensed on record, and be assigned long term permits basis regular road worthiness checks and not be limited by age. Furthermore, no permit licence needs be charged from food carriers.

14. Monitoring and Traceability

There is no promotion of monitoring of reefer parameters in vehicles. This allows for spoilage and excursions in the cold-chain, effecting trade. The user industry also does not look beyond immediate costs to understand the value gain of such added systems. The same applies to cold storages. Any resulting loss becomes a transaction offset instead of viewing its long term impact on our food supply.

There is no incentive to operators to roll in new technology in monitoring of reefer transport.

With India wishing to bring in more stringent food traceability and quality norms, to lead the way, use of data loggers and operational monitors should be supported through specific policy interventions (instead of being enforced) by discounting toll charges to those using traceability, etc. Monitoring will also allow implementation of long standing need for a fast track corridor to cold-chain transportation.

15. Merchandising Infrastructure

Front end retail that completes cold-chain includes street vending carts and retail shelves, display cabinets and retail side storage.

This has met little promotional focus and is cause for last mile loss in value including physical wastage. This also applies to non-F&V cold-chain in case of vaccines, ice-cream and meats & fish.

Cold-chain development focus missed out on development of retail infrastructure.

Promoting a modern front end will not only reduce daily wastage at POS, but will also complete the integrity of intent of the cold-chain. A modern retail format intrinsically brings quality, traceability and promotes direct collaboration.

Standards and Protocols

16. Handling Protocols

Standards & Protocols must be as guided by regulatory authorities like

FSSAI, WDRA, BEE etc. In the cold-chain, standards are guidelines to assure an end-result and not merely a restrictive BOQ list of goods. As such, compliance protocols require development as the primary driver for standards that need to be maintained.

Product and sector specific Protocols are required at a national level.

Collective approach to develop standardised operations and safety checks is under-developed. This is making the cold-chain too esoteric for its participants.

17. Infrastructure Design Standards

Current standards are in nascent stage and largely to facilitate the process for appraising a project. This attention to the engineering costs and design has a tendency to limit innovation or the induction of new technologies.

Design standards require developing which focus on the specific safety of users and generic safety of consumers. Standards should focus across the entire activity chain. For example, our standards are largely focussed on cold store design only.

Specific standards on alternate technologies could be developed to strategically focus attention pilot projects for innovation incubation.

Current design standards focus on initial project components and need to extend across other integrating aspects of cold-chain.

Critical aspect of any cold-chain is first mile preconditioning (blast freezers, pre-coolers, etc) and last mile delivery. Standards, protocols or guidelines should not ignore these components which are most important to developing trade in the cold chain. Special design standards for delivery transport and product specific design for pack-house and pre-coolers are missing.

18. Commercial Protocols

There exist no guiding principles to assist transactional bottleneck in cold-chain trade. There is an enhanced risk

to cold-chain operators when handling perishable products wherein the service cost is disproportionate to risk and cost of goods handled.

Protocols for commercial transactions with a cold-chain specific redressal mechanism are not available. Neither is there any domain specific national level focus on this.

Fear of risk exposure negatively impacts cold-chain development.

Developing models that serve to empower and enable the producers to extend reach to the end consumers are being explored. In case of horticulture, we must take on a target that our farmers actually are able to sell to different markets every year, instead of being restricted to the closest mandi. The one area that the logistics industry has failed to recognise, is that this vacuum allows them to move up the value chain by partnering with the producers. Worldwide, the logistics service providers have required extending themselves beyond merely servicing the value chain to own the cold-chain. This space is today open for service brands to be established, new business streams to develop.

Skilled Resources

19. Promoting Knowledge Based Services

Agriculture extension services including education and training at farmer level is exempted from service taxes. Yet, cold-chain which serves as an extension to market from farm, does not find mention in such waivers.

The knowledge gap is most acutely felt in cold-chain, largely as this service sector has yet to develop beyond the previous infrastructure development focus.

Appropriate skill-sets are intrinsic to cold-chain since such service involves product and cargo specific inputs and continuous attention. These skill sets are in addition to those needed in the ordinary supply chain or other generic logistics activities.

Knowledge dissemination as a service to cold-chain development

needs a thrust.

Cold-chain training, awareness initiatives and skill development services should be included in negative list for service taxation, as part of the national cold chain development initiative.

20. Resource Integration

Cold-chain is evident and successful in segments like frozen foods, dairy, pharmaceutical products as these require minimal skill-sets. Yet, the infrastructure and resource use has commonality.

Cold-chain is identified primarily with fresh farm produce whereas processed, fresh frozen and medical cold-chain is synergistic in skill and other resource utilisation.

Incorporating various synergistic uses will aid cold-chain development by providing scope to reduce viability gap and in enhancing operational skill sets. Most critically it will promote sharing of skilled resources across segments.

Inter-industry coordination is required to promote resource integration of cold-chain across segments and not focus only on term storage of F&V produce.

Policy makers & industry should cater to allow for the total cold-chain utility instead of differentiating between product types. An inclusive policy across segments will add viability to the developing trade.

21. Knowledge Cadre Missing

Cold-chain is currently the domain of technology makers, the focus remains on equipment and machinery whereas these are but tools of the service trade. Flexible designs of cold chain infrastructure will allow added utility given diverse produce cachement and flexible work force. Yet earlier focus remained on rigid standard designs as marketed by companies.

The operational and handling practises for perishable cargos does not factor in the fragmented yield lots that will be handled at Indian cold-chain establishments at first mile stage. The

economic learnings on the cold chain from non-Indian sources focuses on large volume yields... leading to injudicious choices of equipment and machinery.

India would benefit from a move from mass storage to direct-access storage, yet there is minimal focus on this option – most thought is focussed on traditionally understood concepts on cold-chain.

Disconnected from India's Human backdrop - The largest disconnect exists in ignoring the awareness and training gap. Untrained application of the cold chain creates greater losses.

- ▼ While the viability gap and the seminars addressing it focus largely on the power factor. In truth, untrained utilisation adds phenomenally to power wastage.

- ▼ Operating errors lead to shrinkage, wastage, damage and all these occur after energy application. This thereby translates into gross energy loss.

- ▼ Lack of Domain Skills or access to trained knowledge base – nascent centralised knowledge resource specific to F&V care.

- ▼ No specialized institutes for cold chain technicians – only on the job training.

- ▼ No central body of knowledge on good cold chain practices for managers.

- ▼ No Training to financing bodies – lack of domain understanding.

Given the present situation, we require focused development of –

Technical Cadre – Engineers and technicians, who can install, commission, maintain and maximise the various equipment required in the cold chain.

Knowledge Cadre – a cadre who will take decisions on appropriate climate control and handling for various cargo types; to enable extracting maximum realisation from any unit of produce.

Both user and service Industry requires allocating more resources to enhance knowledge.