

## What We Do

CryoLogistics is developing a low-maintenance, net-zero emissions, temperature controlled pallet box for the global food and pharmaceutical cold chain industry. The intent of this unit is to augment/replace the complex, expensive and GHG-emitting truck and trailer refrigerators used to ship temperature sensitive products worldwide. Our unit is simple, economical, scalable, customizable and offers significant operating efficiencies to improve customer satisfaction and profit margins. It has no moving parts, operates silently, emits no particulate matter and enables source loading and mixed loads of dry and refrigerated cargo.



### Minimal Viable Product

Our modular unit is based on a scalable design that can be customized to each end-user's requirements.

## The Market Opportunity

The cold chain industry spans the production, transportation, wholesaling, distribution and retail sale of high value temperature sensitive consumables. More than 110 million metric tons of perishable food product is shipped around the world aboard millions of individual transport refrigeration units (TRUs) each year. Over 150,000 TRUs are being manufactured annually, representing a \$15B market opportunity. Each TRU is a complex and expensive electromechanical system that depends on diesel fuel and/or electricity. These systems produce cold energy, while emitting large quantities of greenhouse gasses, particulate matter and noise. They also cost several thousand dollars per year to operate and maintain. This has significant financial impact on transport refrigeration, which is a low margin business. The cold chain industry is actively seeking a simple, innovative, economical and climate friendly alternative that will introduce new operating efficiencies, reduce emissions and improve competitive advantage. Our system is that alternative.

## Did You Know?

According to the UN Food and Agriculture Organization global food wastage, **caused in part by inadequate or improper refrigeration**, is estimated to exceed 1.3 billion tonnes annually. That is equal to USD\$2.5 trillion or 30% of total production.

Food security is an escalating problem in many parts of the world. Our unit will help combat food waste by delivering an economical refrigeration capability in regions where it does not now exist.

## Putting Nature to Work

Natural refrigerants fell out of favor following the introduction of synthetic refrigerants like HFC, HCFC and CFC in the mid-1900s...but they're making a comeback. The Montreal Protocol has led to a global phase down of synthetic refrigerants, resulting in a revitalized interest in nature's climate friendly alternatives. Carbon dioxide is an abundant, naturally occurring, efficient, economical, safe and stable refrigerant that is receiving widespread acceptance in commercial and industrial applications. We believe that nature is full of promise when it comes to technical innovation and our team is putting nature's refrigerant back to work.



## Applications

Our refrigeration technology can be adapted to fit the needs of a variety of applications including food and pharma production, over-the-road trucking, intermodal rail & marine transport, air cargo, cold storage warehousing, food distribution centres, grocery retailers and food service providers.

## Investor Contact

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registered in British Columbia.**



## Path to Market

Our commercialization strategy begins with a thorough knowledge of the market, gained through customer discovery interviews with cold chain industry stakeholders. Several stakeholders have agreed to be our pilot partners. We anticipate that our pilot partners will become early adopters, endorsing the system's benefits and value proposition and promoting it to their industry partners (*i.e. food producers, wholesalers, distributors and retailers*). Pilot partners strongly influence buying behavior within our target market, which is the line-haul and less-than-truckload segments in North America, Europe and Asia.

## Positioning Statement

Keeping a load of high value perishable product at its correct temperature, while in storage and transit, is critical to consumer health, product quality, value retention and industry profitability. Our system has no moving parts and requires no electrical energy. It provides rapid, reliable, efficient and economical cooling power on a scale that out performs electromechanical conventional vapor compression systems. Our system offers a ~12% lower total cost of ownership, increases equipment optimization, accelerates ROI and reduces emissions by ≥80%.

## Our Joint Development Partners

In addition to UVic and Camosun College, CryoLogistics is partnered with the Foresight Cleantech Accelerator Center, NRC-IRAP, Mitacs, NSERC and with Cold Star Solutions Inc., a BC-based cold chain company. Our advisory board consists of nine career business, academic, engineering and finance professionals.

## Core Technology

Our core technology combines a passive (*patent pending*) thermal diode heat exchanger coupled to a sealed carbon dioxide heat sink. This system uniformly removes heat energy from a transport unit's cargo load space and establishes the desired temperature set-point without auxiliary power or electromechanical components. Our minimum viable product is a modular thermally insulated transport load unit capable of safely refrigerating a palletized shipment of temperature sensitive product for up to four days. It is truly simple and truly elegant.

## Development Milestones

Our goal at CryoLogistics is to develop practical solutions to the problems being experienced throughout the cold chain. We are listening to the industry and responding by developing a technology that will achieve the operating and performance metrics that the industry is seeking. We are partnered with the University of Victoria Faculty of Mechanical Engineering and the Camosun College Applied Technology Program to design, build, test and validate our system's technical and economic feasibility. Our proof of concept (*alpha*) prototype will be completed and ready for demonstration by Q4 of 2017. Our beta prototypes will be ready for field trials in Q2 of 2018.

## Value Proposition

- Lower total cost of equipment ownership
- Enables mixed loads (*refrigerated & dry*)
- Improved load capacity & versatility
- Better equipment optimization & ROI
- Zero noise & particulate matter emissions
- Net-zero carbon footprint



**NSERC  
CRSNG**

**NRC-IRAP**



**University  
of Victoria**