

Containerized Solar Cold Storage

Jointly developed by Inficold & National Institute of Solar Energy, an apex national R&D Solar Institute of Government of India

This off-grid solar cold-storage enables farm level cooling for perishable commodities. Electricity generated by photovoltaic panels is stored in form of ice to provide cooling during non-solar hours.

Direct expansion (DX) of refrigerant (similar to traditional cold storage) transfers cooling from ice to cold storage - this makes it World's Only DX type Thermal Storage System.

DX cooling enables most energy efficient, fast cooling rates, & precise temperature control in addition to larger thermal storage capacity which is required for high pre-cooling needs.



Features



LOW OPEX

No recurring cost of grid electricity & DG sets



UNINTERRUPTED

4-times more cooling storage capacity than the competition



HIGH SOLAR UTILIZATION

Variable speed compressor enables cooling even during cloudy period



DX COOLING

Precision temperature control and class leading cooling rates



LONG LIFE

ISO Marine Container & Stores cooling in ice instead of shorter life electrical batteries

Product Specification ¹

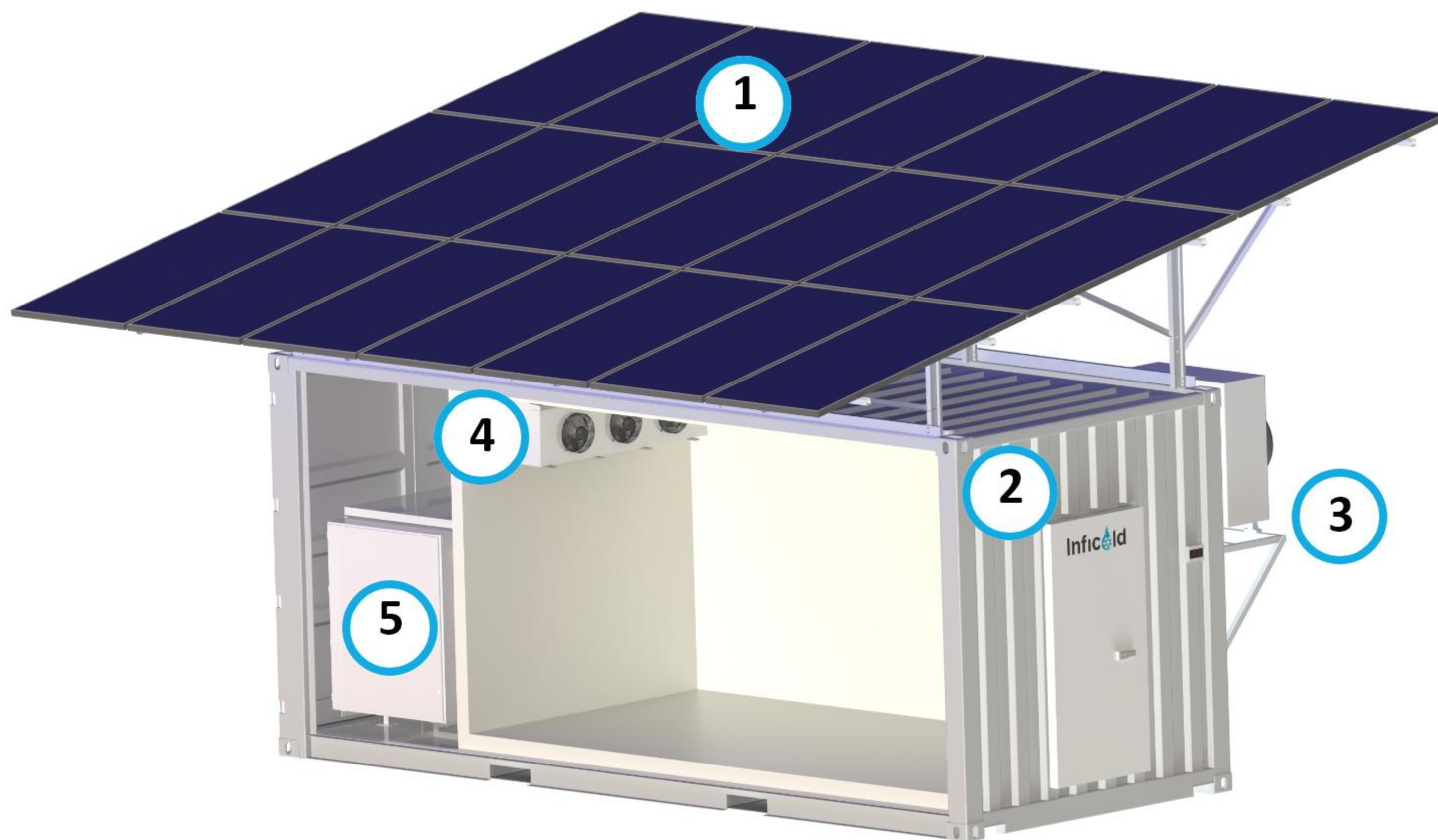
Model	20 ft ISO Marine Container	40 ft ISO Marine Container
Standard storage volume ²	800 cubic feet or 5,000 kg	1,750 cubic feet or 12,000 kg
Temperature range	4 - 10 deg. C with 90 - 95% Relative Humidity	4 - 10 deg. C with 90 - 95% Relative Humidity
Pre-cooling (daily) ³	750 kg/day	2,000 kg/day
Pre-cooling (occasional) ⁴	2,500 kg	4,000 kg
Cooling storage capacity	200 MJ (equivalent 1750 kg of pre-cooling)	200 MJ (equivalent 1750 kg of pre-cooling)
Solar panels	7 kWp	14 kWp
Insulation thickness	100 mm	100 mm
Door openings	8 per day for 30 sec each	8 per day for 30 sec each
Alternate power option	3-Ph Grid	3-Ph Grid

- NOTES:**
- Performance is based on 5.2kWh/m²-day of global solar horizontal irradiance.
 - Tentative quantity in weight. These values are commodity dependent.
 - Pre-cooling is to reduce the temperature of freshly harvested produce from ambient to cold storage temperature. It is assumed to be 30 to 5 deg.C.
 - If daily pre-cooling is not utilized, unused solar energy is stored in thermal storage. Occasional pre-cooling quantity is based on max. thermal storage capacity.

Working Principle

Direct Expansion (DX) type thermal storage system uses similar cooling mechanism as in a traditional cold storage. Compressor makes ice inside thermal storage using solar energy. Refrigerant loop inside thermal storage transfers cooling from ice through direct expansion of refrigerant in a standard evaporating unit.

DX type thermal storage is based on an International Patent Pending Technology (USPTO Patent Granted) by Inficold



1. Solar Panels
2. ISO Marine Grade Container
3. Condensing Unit (includes compressor)
4. Evaporating Unit
5. Thermal Storage System

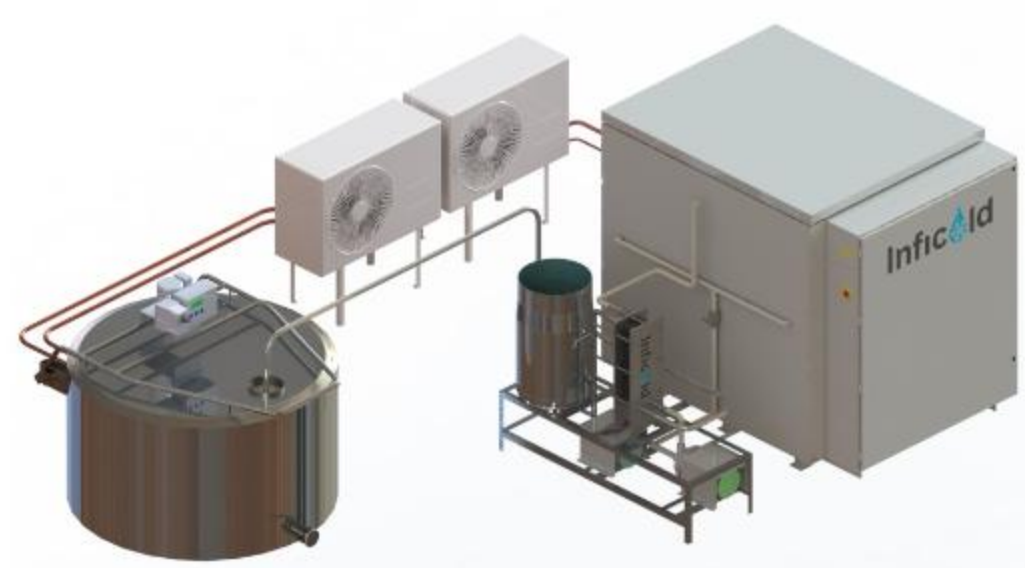
DX Type Thermal Storage Advantages Over Eutectic Plate Thermal Storage

Parameters	DX Type Thermal Storage	Eutectic Plate Thermal Storage
Location	Outside cold area	Mounted on inside walls of cold area
Cooling mechanism	Same as traditional cold storage	Cooling via cold walls
Cooling rates	Same as traditional cold storage	Longer time to cool - 2x slower
Cooling storage medium for non-solar hours	RO Water	Proprietary PCM - ~5 years life
Cooling storage capacity	200 MJ	50 to 75 MJ - lower cooling backup
Temperature control	Same as traditional cold storage	Difficult - cannot stop cooling
Temperature uniformity	Same as traditional cold storage	Prone to chilling injuries near walls 5 to 10 deg.C non-uniformity expected
Water drainage	No exposed water inside the cold storage	Prone to damage by molds & fungi Water drips on eutectic walls

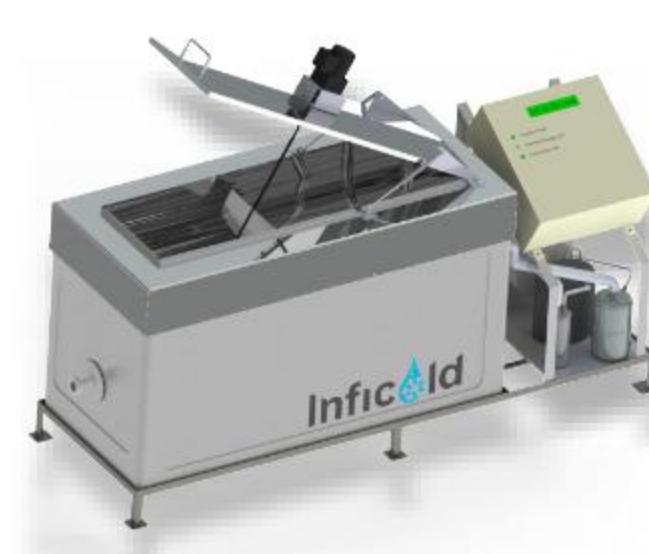
Other Product Offerings



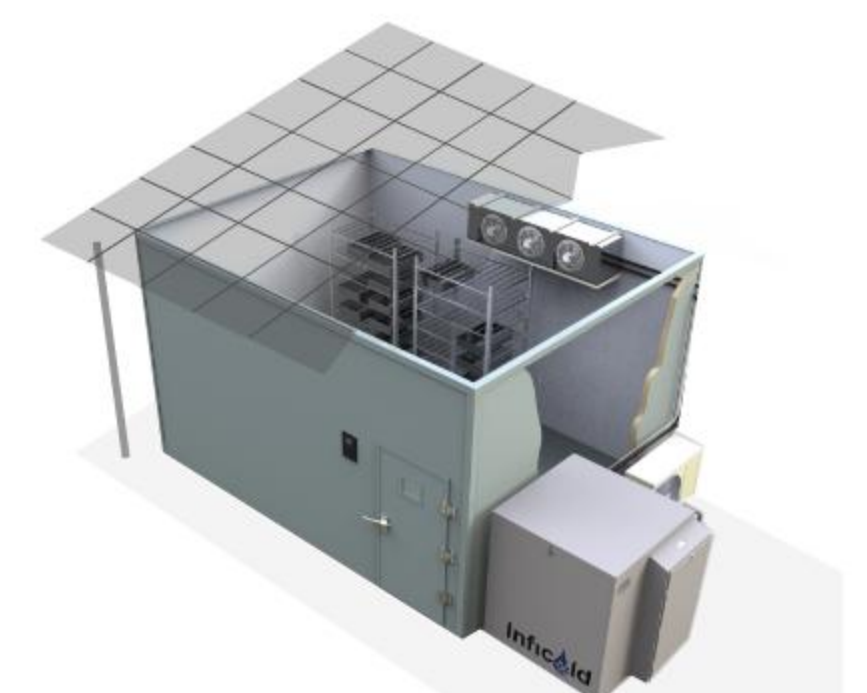
Solar Bulk Milk Cooler



Solar Instant Milk Chiller



Solar 150L Milk Cooler



30+ MT Solar Cold-storage