



Contained Energy Solar Powered Cold Storage Systems



Summary

It is widely accepted that fishing- (and farming-) communities can substantially increase their income if refrigeration is available. However, in remote communities, where no grid power is available, the conventional solution of powering refrigeration with diesel gensets often fails because of significant operating costs (and who pays for what) and logistical challenges.

Now, there is a solution that overcomes these problems.

Contained Energy has successfully developed and deployed stand-alone, off-grid, 100% solar-powered cold storage facilities with unique cost-economy through the application of thermal energy storage (TES) technology in combination with ultra-efficient compressor packages.



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The 20 m³ unit shown here was designed to keep 500 kg of fish at -2° C, with the capacity of adding and cooling 200 kg of 'un-iced' fish per day (for a total cooling load of 30 kWh per day).



It is energized by a 6.4 kWp solar array through a 3-phase inverter system, backed up by a relatively small 10 kWh VRLA battery bank.



The unique feature of the system is that it deploys a large volume of Phase Change Material (PCM) in the ceiling, capable of storing and releasing 15 kWh of cooling capacity at -4° C. This thermal energy storage technology

allows the compressor package to do most of its 'cooling work' during the day, when the solar power is available, saving a substantially larger quantity of battery storage that would otherwise be required.

The unit features walls, ceiling and floors constructed from 15cm insulated modular panels, stainless steel door with heating element, aluminum checkered floor plates, lighting and a programmable digital control system.

This particular system can be build into a 20' shipping container, and other sizes and capacities, such as walk-in freezers, down to -30 ° C are possible as well.

