

SUSTAINABLE COLD STORAGE

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A new cold storage solution is gaining traction in the Philippines. The refrigeration is supplied by a recently commissioned biomass powered Thermochiller. This effectively eliminates the carbon footprint.



The cold storage warehouse has nine rooms with a total of 4500 pallet positions. The cold is delivered to each room by two fan coils containing dilute aqueous ammonia (“aqua”), which has exceptionally low pumping power and excellent thermal properties. The aqua in turn is chilled by the 80 ton Thermochiller (“TC80”).

The TC80 ammonia absorption refrigeration unit is powered by a rice husk (“ipa”) fired boiler. When the rooms are set at -15°C , the boiler supplies 4 bar steam to the TC80 to provide -23°C at the evaporator. When the rooms are required to be at -25°C , the boiler pressure is increased to 8 bar, for an evaporator temperature of -32°C .

This cold storage installation provides the ultimate in sustainability. One bag of ipa keeps one room cold for one hour. The electric savings for all nine rooms is over 150 kW on a 24/7 basis. The ammonia charge in the TC80 is very low: 2 kg per ton. Since the ipa is a byproduct of growing and producing rice, there is no net CO₂ emission.

This sustainable refrigeration is not limited by biomass availability. It is equally carbon-free with any source of heat that does not produce CO₂, such as solar thermal heat, exhaust heat (from a CHP plant), or geothermal heat. It can also be backed up by conventional fuel for high reliability in emergency situations.

This technology can deliver affordable sustainability to many other energy intensive activities. It deserves a much closer look by the clean energy community.

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