

COPELAND VARIABLE SPEED TECHNOLOGY

# Ushers in a new era in refrigeration with enhanced energy savings and performance



*A major online retailer in India wanted to upgrade the refrigeration system of their storage facility.*

## Customer

The cold room was filled with a wide assortment of fresh meats and produce.

- Application: Meat Storage @ 0-4 °C
- Refrigeration system: Two fixed-capacity condensing units
- Common thermostat for temperature control
- Storage capacity: 1.2-1.5 MT; 1800 ft<sup>3</sup>

## Challenge

- Reduce operating costs
- High electricity costs
- Precise temperature control
- Reduce system downtimes
- Fluctuating temperatures due to frequent door opening
- Inefficient pull-down time







## Solution

Modulated cooling solution with variable speed refrigeration condensing unit.



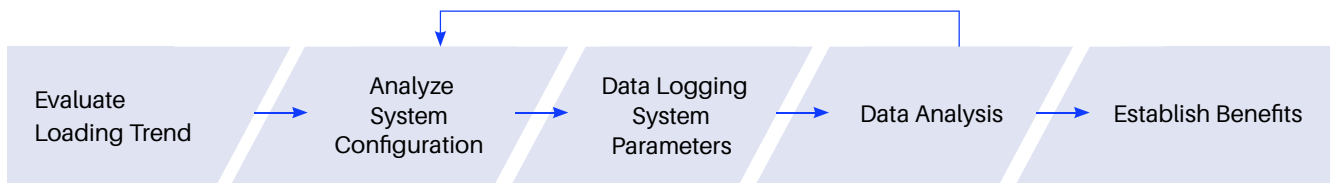
## Result

After installing Copeland's variable speed condensing unit, the following improvements were observed:

-  25-30% energy cost savings
-  Over 50% reduction in pull-down time
-  Stable suction pressure and consistent room temperatures
-  Reduced on-off cycling
-  Suction lift improvement
-  Minimized carbon footprint



## Approach

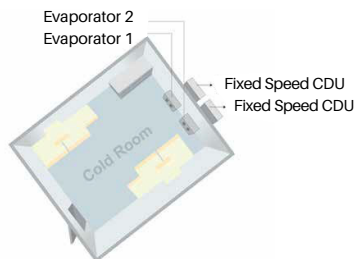


## The Copeland advantage

### System Configuration:

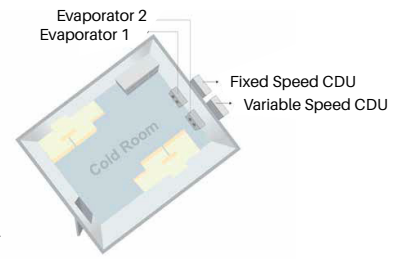
#### Base System

- Two Fixed Compressor Condensing Units (3.6 kW\*2)



#### New System

- One Fixed Compressor Condensing Unit (3.6 kW)
- One Variable Speed Compressor Condensing Unit (3.6 kW)



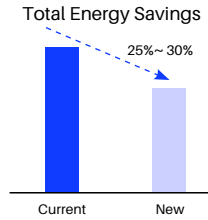
Rated Condition: (Evaporating Temp: -6.7°C, Ambient 35°C, Return Gas Temp: 18.3°C, Frequency: 50Hz)

Test duration: 12 hours

Time of the day: 5 pm evening to 5 am next morning

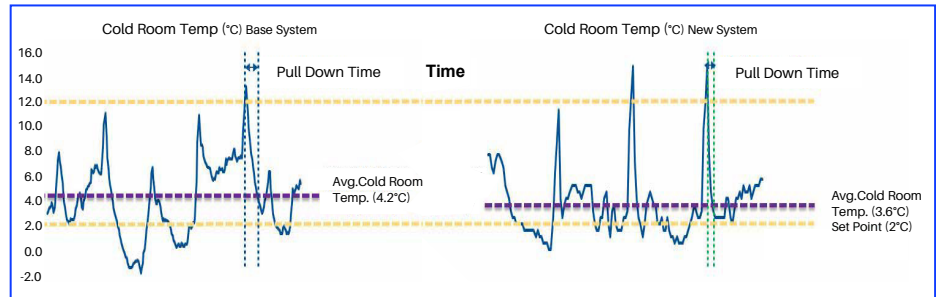
## Energy bill reduction

- Savings per day: 12-15 kWh
- Annual energy cost savings (1 k-Wh ~ INR 9): INR 45K
- Average return on investment: 2 years



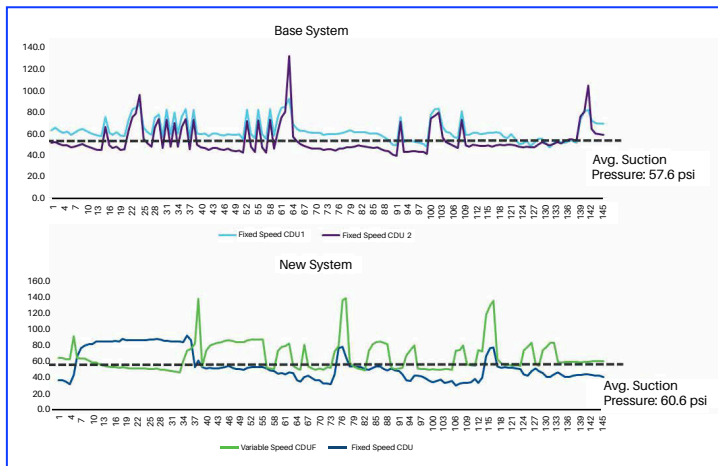
## Faster pull-down and improved temperature stability

- Pull-down time reduced by ~40% over base system
- Improved temperature stability
  - Average cold room temperature closer to set point in new system by 0.6 °C
  - Controlled relative humidity

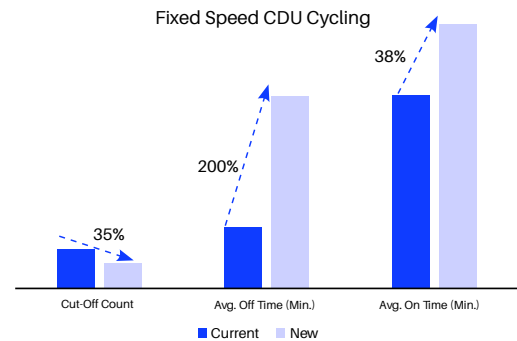


## Stable suction pressure and suction lift

- Suction lift of 3 psi
- Higher energy savings
  - 1 psi increase in suction pressure leads to ~1% improvement in EER



## Improved system reliability



## Key Findings:

- ~ 35% Reduction in compressor cut-off count on thermostatic cut-off
- ~ 200% Increase in average compressor off time
- ~ 38% Increase in average compressor on time

With its global talent, superior technology and comprehensive solutions, Copeland is in a unique position to support end users in achieving higher service levels, cost optimization and reduce carbon footprint.

To learn more, visit [copeland.com](https://www.copeland.com)

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