CASE STUDY

COPELAND REFRIGERATION SCROLL SOLUTION

Dairy company optimizes operations with Copeland refrigeration scroll solution

Accurate and consistent processing temperature is a key parameter that impacts quality, taste, texture and shelf life of dairy products.

An Indian milk processing company needed to upgrade its large-scale commercial refrigeration system suited for warm tropical climates.

Challenge

A milk processing unit in Southern India needed a refrigeration system for a curd blast chilling application. The unit faced **inconsistent curd quality, high energy bills** and **space constraints. Loud noises** also emanated from its existing refrigeration system, disrupting adjacent facilities. Their contracting partner Pragya Refrigeration turned to Copeland for optimum refrigeration solution.

Solution

Copeland India-manufactured air-cooled condensing unit (KHZ622PAL) with Copeland ZB large scroll compressor:

- 20% lighter than previous system
- Minimal noise and vibration
- 50kW cooling capacity
- R404A refrigerant

Result

Working together with Pragya Refrigeration, Copeland enabled on-time delivery and facilitated installation of the air cooled condensing unit that achieved:

- Reduced monthly energy bills by 6-7%
- Space savings from rooftop installation
- Enhanced efficiency by up to 10%
- Low noise and vibrations
- Decreased carbon footprint
- Sustainable long-term solution

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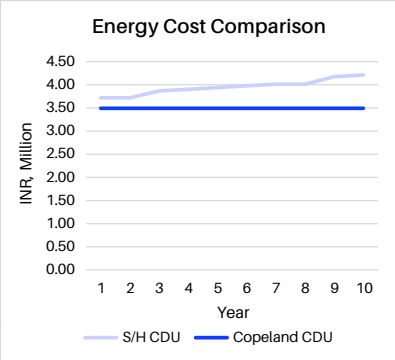
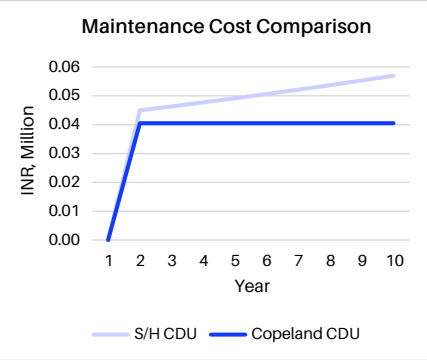
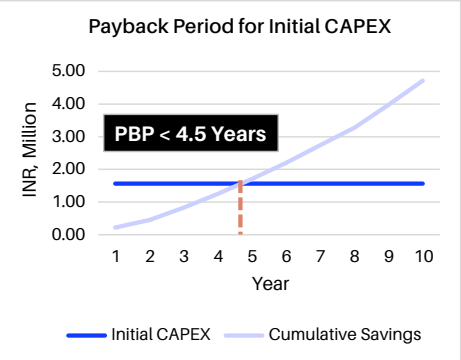
Result (continued)

The refrigeration solution projects a payback period in less than 5 years for the initial CAPEX with the Copeland ZB scroll compressors versus semi-hermetic compressors.

With its global talent, superior technology and comprehensive solutions, Copeland is in a unique position to advance the food manufacturing industry.







Scroll vs Semi-hermetic compressor comparison

Life cycle cost simulation

	Current system: Semi-hermetic Condensing Unit				New system: Copeland™ Scroll Condensing Unit						
Years	**S/H CDU cost**	**Energy cost**	**Maintenance cost**	**Total cost**	**Copeland CDU cost**	**Energy cost**	**Maintenance cost**	**Total cost**	**Yearly savings**	**Cumulative savings**	**Cumulative savings %**
Year 0	1.57	0.00	0.00	1.57	1.57	0.00	0.00	1.57	0.00	0.00	-
Year 1	0.00	3.72	0.00	3.72	0.00	3.49	0.00	3.49	0.23	0.23	4.26%
Year 2	0.00	3.72	0.05	3.76	0.00	3.49	0.04	3.53	0.23	0.45	5.03%
Year 3	0.00	3.87	0.05	3.91	0.00	3.49	0.04	3.53	0.38	0.83	6.44%
Year 4	0.00	3.90	0.05	3.95	0.00	3.49	0.04	3.53	0.42	1.25	7.41%
Year 5	0.00	3.94	0.05	3.99	0.00	3.49	0.04	3.53	0.46	*1.71	8.18%
Year 6	0.00	3.98	0.05	4.03	0.00	3.49	0.04	3.53	0.50	2.20	8.85%
Year 7	0.00	4.01	0.05	4.07	0.00	3.49	0.04	3.53	0.53	2.74	9.45%
Year 8	0.00	4.01	0.05	4.07	0.00	3.49	0.04	3.53	0.54	3.27	9.90%
Year 9	0.00	4.17	0.06	4.23	0.00	3.49	0.04	3.53	0.70	3.97	10.65%
Year 10	0.00	4.21	0.06	4.27	0.00	3.49	0.04	3.53	0.74	4.71	11.34%
Total	**1.57**	**39.53**	**0.46**	**41.55**	**1.57**	**34.91**	**0.36**	**36.84**	**4.71**		

Assumptions:

1. The recip compressor power consumprtion remains same for the first 2 years & increases every year by 1 % after year 3

2. The scroll compressor power consumption is constant throughout its life cycle

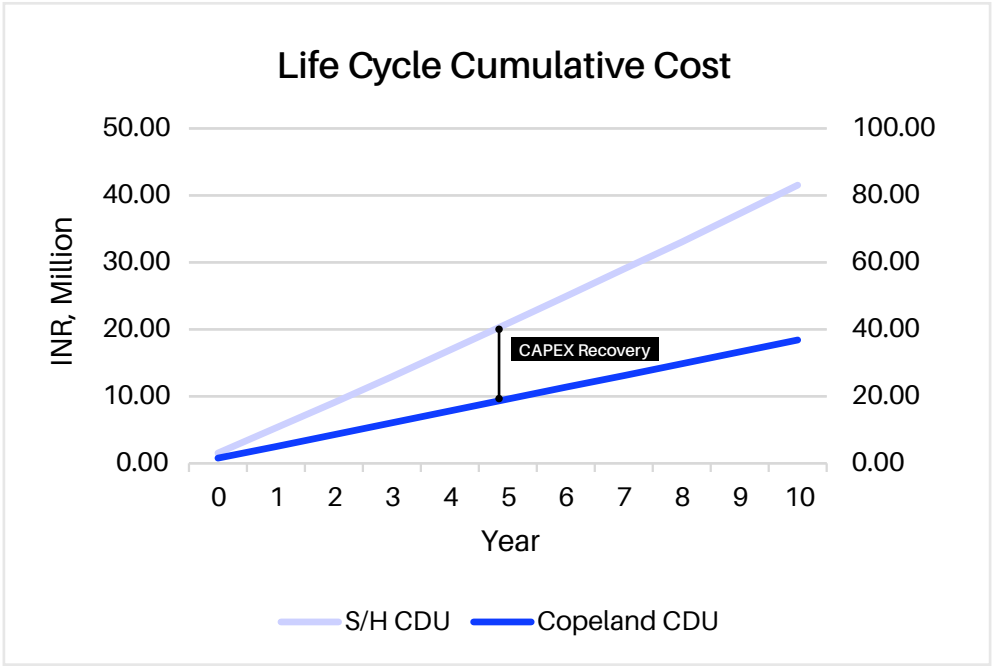
3. Repair, maintenance & servicing for recip condensing units is assumed at 50% of the refrigeration system's annual maintenance cost for year 1 & increases by 3% every year

4. Repair, maintenance & servicing for scroll condensing units is assumed at 50% of the refrigeration system's annual maintenance cost & will remain constant throughout its life cycle

5. Cost of system disposal at the end of its life is not considered

6. Initial installation & comissioning costs for both the systems are equal

Notes:
* CAPEX recovery in less than 5 years.
INR, Million



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