Amrut H. Patel

AMRUT PATEL & ASSOCIATES
ARCHITECT & CONSULTING ENGINEER

TO WHOMSOEVER IT MAY CONCERN

COMMISSIONING CERTIFICATE

To,

1. The project Manager
   Bureau of Energy Efficiency
   4th Floor, Seva Bhavan, New Delhi
2. The Representative
   United Nation Industrial Development Organization (UNIDO)
   New Delhi

Subject: Submission of letter for certifying procurement quotation and commissioning of pilot project

Dear Sir,

As per purchase order no.3000066188 dated 5/12/2018 from UNIDO for "promoting energy efficiency and renewable energy in selected MSME cluster in India" for implementation of pilot project of "Screw Chiller Package Air Conditioning" at M/s AmulFed Dairy, Gandhinagar, Gujarat State, India and tri party agreement between BEE, UNIDO and M/s AmulFed Dairy, Gandhinagar (A Unit of GCMMF Ltd).

I certify that the owner completed pilot project and commissioned successfully after trial run.

I observed and inspected procurement quotation material, erection and trial run of screw chiller package for air conditioning and found satisfactory.

I also found commissioning data satisfactory as specified in agreement for new technology for working/in operation.

Hereby with this, I am certifying the new implemented project erection and its operation satisfactory & successful after trial run/commissioning.

Signature of Chartered Engineer

Amrut H Patel
(AM/076943/9-078/CI-AMIE)

16/01/2019

PERFORMANCE REPORT OF DEMO. PROJECT

(250 TR PACKAGE CHILLER)

AT

AMULFED DAIRY, GANDHINAGAR

(A GCMMF UNIT)

(GUJARAT DAIRY CLUSTER)

Summary:

(A) Project commission by: October 2018

(B) Performance Summary from November 2018 to December 2019

Total energy savings (KWh)	: 232558
Present energy charges	: 7.5 Rs/ KWh
Total Cost Savings	: 17,44,185
Total Reduction in CO2 emission	: 186

Thaking you,

Regards

Authorised Signature,

AmulFed Dairy, Gandhinagar

Preamble

Bureau of Energy Efficiency (BEE) is implementing a BEE-SME program to improve the energy performance in 12 selected SME's clusters. Gujarat Dairy Cluster one of them.

At present there are 17 main Dairy units, 29 Chilling Centers, 08 Cattle Field plants and1 Polymer Film Packaging plant under dairy cluster.

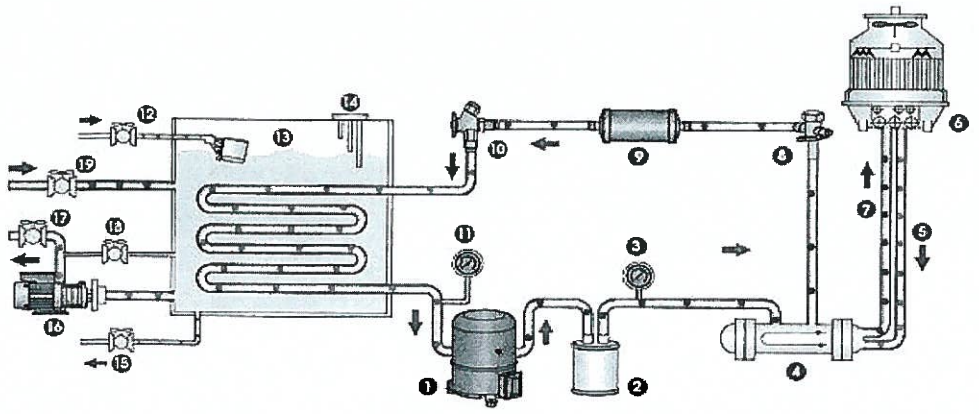
Installation of 250 TR package chiller technology was selected for providing financial support under GEF-UNIDO-BEE Project. The system has been duly installed and commissioned in November 2018.

PROJECT OUTLINE

Broad system details are as under:

Technical Details of Chiller :	
Chiller Type	Water Cooled and Skid Mounted
Compressor Type	Screw & Semi Hermetic
Compressor Make	Screw & Semi Hermetic
Refrigerant Type	R 134 or Suitable (Non CFC only)
No of Chillers and Comp.	Chiller-01 and Compressor-02
Capacity of Chiller	250 TR
COP desired	4.9 to 5.1 desired
Evaporator & Condenser type	Shell & Tube type/PHE

Following figure shows a schematic of actual installation.



❶ Compressor
❷ Oil Separator
❸ High-Pressure Gauge
❹ Condenser (Shell & Tube)
❺ Cooling Water Supply
❻ Cooling Tower
❼ Cooling Water Return
❽ Shut Off Valve
❾ Filter Dryer
❿ Expansion Valve
⓫ Low-Pressure Gauge
⓬ City Water Supply
⓭ Evaporator & Tank
⓮ Level Sensor
⓯ Drain Valve
⓰ Circulation Pump
⓱ Cooled Water Supply
⓲ By-Pass Valve
⓳ Cooled Water Return

Project implementation mile stones are as under.

Sr. No.	Particulars	Details
1	Current status of the project	Running Normal
2	Commencement of project	04/01/2018
3	Completion of Installation work	01/10/2018
4	Project Commissioning	11/10/2018
5	System working	OK

OPERATING PHILOSPHY:

Basic operational schemes include:

- Daily start-up
- Daily shutdown
- Normal operation

Power Saving analysis:

PERFORMANCE DATA (AS PER SCHEDULE-V)

Year of Actual Operation						
Month	Refrigeration Load (RT)	Power Consumption (kWh)	Specific Power Consumption (kW/RT)	Saving (kWh)	Saving (Rs.)	Remarks
Nov.18	62857	55847	0.88	13828	103710	
Dec.18	63033	55077	0.87	14497	108727.5	
Jan.19	64336	55329	0.86	15440	115800	
Feb.19	61844	54413	0.87	14224	106680	
Mar -19	75668	65515	0.86	18160	136202	
April – 19	84880	74748	0.88	18673	140047	
May -19	88690	82472	0.92	15964	119730	
June – 19	80700	74494	0.92	14526	108945	
July - 19	84950	75388	0.88	18689	140167	
Aug -19	71314	61163	0.85	17828	133713	
Sep-18	75325	63182	0.83	20337	152527	
Oct-19	74537	62476	0.84	19379	145347	
Nov-19	61399	52060	0.84	15963	119729	
Dec-19	55742	46279	0.83	15050	112875	

PERFORMANCE PARAMETERS (Daily log sheet)

Since installation, the system has been working in Auto mode. Summary of performance is as under:

PERFORMANCE MONITORING SHEET FOR 250 TR CHILLER PACKAGE OF PET LINE

Date	% Load - comp -1	% Load - comp -2	CHILLER								
			Refrigeration load (RT)	Chiller Input Power with auxiliary (kW)	Chiller Efficiency kW/RT	Evaporator			Condenser		
						Flow (m3/hr)	CHWST (°C)	CHWRT (°C)	Flow (m^3/hr)	CWST (°C)	CWRT (°C)
01/03	75		2117.46	1862	0.88	116	8.2	10.5	150	28	30
02/03	74		2117.46	1805	0.85	116	8.1	10.4	148	28	28
03/03	76		2301.59	1983	0.86	116	8	10.5	155	29	28
04/03	80		2209.52	1837	0.83	116	8.1	10.5	149	28	28
05/03	81		2117.46	1762	0.83	116	8.1	10.4	151	29	28
06/03		82	2209.52	1903	0.86	116	8.4	10.8	151	28	28
07/03		82	2209.52	1973	0.89	116	8.6	11	155	27	28
08/03		81	2281.75	2076	0.91	115	8.4	10.9	152	29	28
09/03		75	2301.59	2076	0.90	116	8.3	10.8	151	29	28
10/03		78	2373.02	1990	0.84	115	8	10.6	150	30	28
11/03		80	2715.87	2253	0.83	118	7.9	10.8	148	30	28
12/03		80	2414.29	2171	0.90	117	8.1	10.7	148	29	28
13/03		81	2622.22	2279	0.87	118	8.1	10.9	149	31	33
14/03		85	2622.22	2282	0.87	118	8.1	10.9	148	30	32
15/03		84	2622.22	2240	0.85	118	8.1	10.9	150	29	31
16/03		84	2669.84	2298	0.86	116	8	10.9	149	30	32
17/03		82	2464.29	2097	0.85	115	8	10.7	151	31	33
18/03		85	2434.92	2051	0.84	118	8.1	10.7	148	30	32
19/03		84	2414.29	2084	0.86	117	8.1	10.7	147	31	33
20/03		86	2434.92	2094	0.86	118	8.4	11	149	31	33
21/03		87	2434.92	2128	0.87	118	8.3	10.9	150	32	34
22/03		88	2434.92	2101	0.86	118	8.3	10.9	151	31	33
23/03		86	2485.71	2145	0.86	116	8.1	10.8	149	32	34
24/03		86	2464.29	2148	0.87	115	8.2	10.9	148	31	33
25/03		84	2485.71	2154	0.87	116	8.1	10.8	150	31	33
26/03		85	2528.57	2167	0.86	118	8.2	10.9	149	31	33
27/03	75		2622.22	2263	0.86	118	8.1	10.9	148	30	32
28/03	80		2434.92	2131	0.88	118	8.3	10.9	150	31	33
29/03	81		2622.22	2300	0.88	118	8.1	10.9	148	32	34
30/03	81		2738.89	2420	0.88	119	8.1	11	147	32	34
31/03	81		2761.90	2442	0.88	120	8.1	11	148	31	33
MAX	81.00	88.00	2761.90	2442.00	0.91	120.0	8.60	11.00	155	32	34
MIN	74.00	75.00	2117.46	1762.00	0.83	114.0	8.20	10.40	147	27	28
AVG	78.40	83.10	2440.91	2113.39	0.87	116.9	8.16	10.79	150	30	31
Total			**75668.25**	**65515.00**							

Chiller Plant KW data AUG - 19

DATE	READING	DIFF.	Total flow	Diff	AVG delta	TR	Running hr
01-08	754862	1813	132626	2912	2.5	2407.407	18:11
02-08	756675	2349	135538	2862	2.5	2366.071	17:10:00
03-08	759024	1951	138400	2860	2.5	2364.418	13:06:00
04-08	760975	1957	141260	1467	2.5	1212.798	19:05:00
05-08	762932	1968	142727	1468	2.5	1213.624	18:55:00
06-08	764900	1963	144195	2888	2.5	2387.566	19:31:00
07-08	766863	1920	147083	2836	2.5	2344.577	19:20
08-08	768783	2339	149919	2892	2.5	2390.873	23:08
09-08	771122	2365	152811	2864	2.5	2367.725	23:25
10-08	773487	2401	155675	2850	2.5	2356.151	23:34
11-08	775888	1998	158525	2845	2.5	2352.017	0.85
12-08	777886	2276	161370	2800	2.5	2314.815	20:40
13-08	780162	2144	164170	2890	2.5	2389.22	21:20
14-08	782306	2379	167060	2848	2.5	2354.497	22:11
15-08	784685	2166	169908	2951	2.5	2439.649	20:44
16-08	786851	1656	172859	2462	2.5	2035.384	16:02
17-08	788507	1975	175321	2915	2.5	2409.888	19:04
18-08	790482	1872	178236	2942	2.5	2432.209	17:50
19-08	792354	1833	181178	2931	2.5	2423.115	17:40
20-08	794187	1841	184109	2923	2.5	2416.501	17:40
21-08	796028	1890	187032	2894	2.5	2392.526	18:14
22-08	797918	1820	189926	2908	2.5	2404.101	18:14
23-08	799738	1838	192834	2951	2.5	2439.649	17:14
24-08	801576	1758	195785	2954	2.5	2442.13	17:10
25-08	803334	1764	198739	2860	2.5	2364.418	17:05
26-08	805098	1850	201599	3012	2.5	2490.079	18:10
27-08	806948	1812	204611	2928	2.5	2420.635	18:20
28-08	808760	1800	207539	2883	2.5	2383.433	18:16
29-08	810560	1822	210422	2909	2.5	2404.927	18:27
30-08	812382	1838	213331	2889	2.5	2388.393	18:38
31-08	814220	1805	216220	2668	2.5	2205.688	17:27
Max		2401		3012		2490.079	
Min		1656		1467		1212.798	
AVG		1973		2782.645		2300.467	
Total		**63564**		**86262**	2.5	**71314.48**	

CONCLUSION:

The system is fully operational and daily monitored properly by the plant operating personnel. Proper records of system parameters are maintained.

Project Erection & Commission by: Shah Engineering / Voltas

Photographs of Existing system and Present system:

Thanking you,

Preparation By: Prashant Sheth

Date: 31/12/2019