DETAILED PROJECT REPORT
ON
ENERGY EFFICIENT PUMP FOR CONDENSER WATER– 3 HP
(BHIMAVARAM ICE MAKING CLUSTER)










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Bureau of Energy Efficiency

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Engineering Growth

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ISTSL

ENERGY EFFICIENT PUMPS FOR CONDENSER WATER-3 HP

BHIMAVARAM ICE MAKING CLUSTER

BEE, 2010
Detailed Project Report on Energy Efficient Pump for Condenser Water (3 HP)
Ice Plant SME Cluster, Bhimavaram, Andhra Pradesh (India)
New Delhi: Bureau of Energy Efficiency;
Detail Project Report No.:

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APITCO Limited

Hyderabad

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Lists of Abbreviations

BEE	- Bureau of Energy Efficiency
DPR	- Detailed Project Report
DSCR	- Debt Service Coverage Ratio
GHG	- Green House Gases
HP	- Horse Power
IRR	- Internal Rate of Return
MoP	- Ministry of Power
MSME	- Micro Small and Medium Enterprises
NPV	- Net Present Value
ROI	- Return on Investment
MoMSME	- Ministry of Micro Small and Medium Enterprises
SIDBI	- Small Industrial Development Bank of India

EXECUTIVE SUMMARY

APITCO Ltd. is executing BEE-SME program in Bhimavaram Ice Plants Cluster, supported by Bureau of Energy Efficiency (BEE) with an overall objective of improving the energy efficiency in cluster units.

Bhimavaram is renowned for the sea food business and is a big hub for fish and prawns culture. The prawns and fish are exported to various countries throughout the world. There are about 80 ice making units in the cluster. The major Energy forms used in the cluster are grid electricity and HSD oil. Electricity is used for driving the prime movers of compressors, pumps, agitators, drives and for lighting. HSD is used as fuel in DG sets for electricity generation in the event of failure of power supply.

The cost of energy as a percentage of end product cost (ice) cost varies anywhere between 48 to 54%. Majority of the industries located in Bhimavaram are engaged in production of ice blocks required for storage and transportation purpose of the sea food. The major component of the ice production is energy cost next to the labour cost.

During the energy use and technology audit in ice plants in Bhimavaram, all condenser water pumps are age old and inefficient and having lower efficiency compare to energy efficient pumps and many pump motors are re-winded. It is well known fact that dirty water applications and inefficient pumps consume more power compare to the energy efficient pumps. To reduce the power consumption by the condenser water pumps during the ice plant operation it is essential to implement energy efficient pumps. By installing Energy Efficient pumps will result considerable energy savings and there by reduction in production cost.

Installation of energy efficient pumps in ice plant for condenser water of 3 HP would lead to electricity saving up to 11170 kWh per year due to improved efficiency.

The DPR highlights the details of the study conducted for assessing the potential for reducing electricity consumption by installing new efficient pumping system in various units of the cluster, possible electricity savings and its monetary benefit, availability of the technologies/design, local service providers, technical features and proposed equipment specifications, various barriers in implementation, environmental aspects, estimated GHG reductions, capital cost, financial analysis, and schedule of project Implementation.

This bankable DPR also found eligible for subsidy scheme of MoMSME for “Technology and Quality Upgradation Support to Micro, Small and Medium Enterprises” under “National

Manufacturing and Competitiveness Programme". The key indicators of the DPR including the Project cost, debt equity ratio, monetary benefit and other necessary parameters are given in table below:

Sr. No.	Particular	Unit	Value
1	Project cost	`(in Lakh)	0.30
2	Electricity Savings	kWh/annum	11170
3	Monetary benefit	`(in Lakh)	0.42
4	Simple payback period	Years	0.72
5	NPV	`(in Lakh)	0.99
6	IRR	%age	107.19
7	ROI	%age	37.38
8	Average DSCR	Ratio	4.21
9	CO_2 emission reduction	MT/year	9
10	Process down time	Days	2

The projected profitability and cash flow statements indicate that the project implementation i.e. installation of energy efficient pump will be financially viable and technically feasible solution for the cluster.

ABOUT BEE'S SME PROGRAM

Bureau of Energy Efficiency (BEE) is implementing a BEE-SME Programme to improve the energy performance in 29 selected SMEs clusters. Bhimavaram Ice Making Units Cluster is one of them. The BEE's SME Programme intends to enhance the energy efficiency awareness by funding/subsidizing need based studies in SME clusters and giving energy conservation recommendations. For addressing the specific problems of these SMEs and enhancing energy efficiency in the clusters, BEE will be focusing on energy efficiency, energy conservation and technology up-gradation through studies and pilot projects in these SMEs clusters.

Major activities in the BEE -SME program are furnished below:

Activity 1: Energy use and technology audit

The energy use technology studies would provide information on technology status, best operating practices, gaps in skills and knowledge on energy conservation opportunities, energy saving potential and new energy efficient technologies, etc for each of the sub sector in SMEs.

Activity 2: Capacity building of stake holders in cluster on energy efficiency

In most of the cases SME entrepreneurs are dependent on the locally available technologies, service providers for various reasons. To address this issue BEE has also undertaken capacity building of local service providers and entrepreneurs/ Managers of SMEs on energy efficiency improvement in their units as well as clusters. The local service providers will be trained in order to be able to provide the local services in setting up of energy efficiency projects in the clusters

Activity 3: Implementation of energy efficiency measures

To implement the technology up-gradation project in the clusters, BEE has proposed to prepare the technology based detailed project reports (DPRs) for a minimum of five technologies in three capacities for each technology.

Activity 4: Facilitation of innovative financing mechanisms for implementation of energy efficiency projects

The objective of this activity is to facilitate the uptake of energy efficiency measures through innovative financing mechanisms without creating market distortion.

1 INTRODUCTION

1.1 Brief Introduction about cluster

Bhimavaram is a town in the West Godavari District in the state of Andhra Pradesh, India. It is located 395 kilometers east of state capita Hyderabad. Bhimavaram is renowned for the sea food business and is a big hub for fish and prawns culture. The prawns and fish are exported to various countries throughout the world. There are about 80 ice making units in the cluster. The major Energy forms used in the cluster are grid electricity and HSD oil. Electricity is used for driving the prime movers of compressors, pumps, agitators, drives and for lighting. HSD is used as fuel in DG sets for electricity generation in the event of failure of power supply.

The cost of energy as a percentage of end product cost (ice) cost varies anywhere between 30 to 45%. Majority of the industries located in Bhimavaram are engaged in for the next batch. The removed ice blocks are further cursed into smaller pieces production of ice blocks required for storage and transportation purpose of the sea food.

1.1.1 Production process

Raw water is pumped from local available water bodies such as pond / stream through raw water pump to overhead tank .

The production area of the plant has an Ice tank made of concrete. The ice tank contains the direct expansion coils, equally distributed throughout the tank and these coils are submerged in brine. The tank is provided with a suitable frame of hard wood for support the ice cans and a propeller or agitator for keeping the brine in motion: the brine in the tank acts as a medium of contact only, the ammonia evaporating in the ice coils extracts the heat from the brine, which again absorbs the heat for the water in the cans.

Raw water from overhead tank is filled into the ice cans. Water is chilled for 48 hours for complete ice block formation. The sp. gravity of brine is maintained at 1180 by adding salt of required quantity. Ice cans of fully formed ice blocks are removed from the chilling tank. The cans are emptied of the ice blocks and replaced into the chilling tank with water by ice crushers and loaded into plastic crates for transportation.

Detailed of process flow chart are finished in Figure 1.1 below:

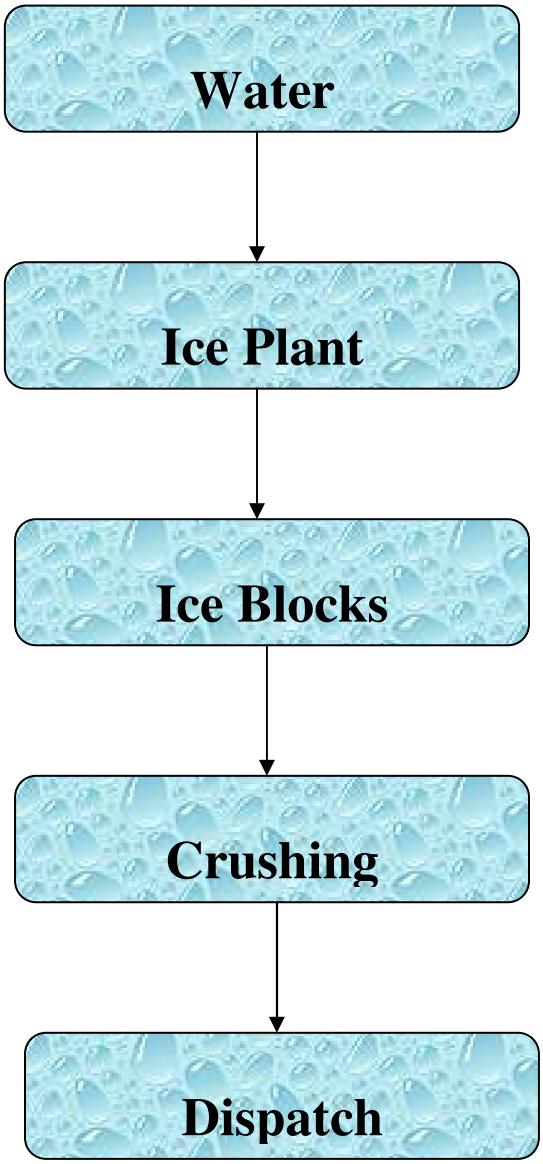


Figure 1.1: General process flowchart of a typical ice making unit

1.2 Energy performance in existing situation

1.2.1 Fuel and electricity consumption of a typical unit in the cluster

The main energy form used in a typical ice making unit in the cluster is electricity and HSD. Electricity is used for driving the prime movers of Compressors, pumps, agitators, ice crushers, lighting etc. The HSD is used as fuel in generators for electricity generation during power failures of grid electricity and is used in emergency situations only. The energy consumption of a typical ice making unit in the cluster using low efficiency and

mono block pumps for condenser water circulation and raw water pumps is furnished in Table 1 below:

Table 1.1: Energy consumption of typical units

S.No	*Unit Name*	Grid Electricity Consumption (MWh/annum)	HSD Consumption (Liters/annum)	Ice Production (tons/annum)
1	Devi Ice factory	456000	6400	4000
2	JSR Ice & Cold Storage	489250	5722	5000
3	Sai Sattya Ice factory	334305	3910	4140

1.2.2 Average production by a typical unit in the cluster

The average production in a typical ice making unit is between 3900 to 5000 tons of ice blocks per annum.

1.2.3 Specific Energy Consumption

The major source of energy for ice making is electricity taken from grid and DG set and the specific electricity consumption per ton of ice production for typical units is furnished in Table 1.2 below:

Table 1.2: Specific energy consumption for typical units

Sr. No.	*Unit Name*	*Units*	*Specific energy Consumption*
1	Devi Ice factory	kWh/tons	120
2	JSR Ice & Cold Storage	kWh/tons	103
3	Sai Sattya Ice factory	kWh/tons	85

1.3 Existing technology/equipment

1.3.1 Description of existing technology

There are about 2 water pumps in each industry connected to condenser water circulation and raw water supply in entire cluster units and these pumps are of very old and mono block type and are inefficient. As per the detailed studies undertaken in various units of the cluster, the efficiency of the condenser pumps is found to be in the range of 30 to 40% only. Further, the output of the pumps deteriorates fast and hence consuming more power. The new energy efficient pumps with efficiency near 60% are available in the market

A detail of existing pump installed in atypical unit of the cluster for condenser water application is given in the Table 1.3 below:

Table 1.3 Existing pump specifications

S.No	Parameters	Unit	Value
1	Flow	LPS	7
2	Head	meters	19
3	Overall Efficiency of pumping system	%	37
4	Motor capacity	HP	5

1.3.2 Its role in the whole process

The condenser water pump is most vital equipments in the plant. The condenser water pump is used for cooling of ammonia in the condenser and run continuously. The power consumption of the water pump is depends on the performance of the condenser and quantity of water circulation.

1.4 Establishing the baseline for the equipment

1.4.1 Design and operating parameters

The present power consumption of a condenser water pump is 3.5 kW. The condenser water circulation pump is operated for 24 hours in a day and for 350 days in a year.

1.4.2 Electricity consumption in existing system

The electricity consumption of pumping system of a typical unit of the cluster is given in Table 1.4 below:

Table 1.4 Electricity consumption

S. No	*Name of the unit*	*Ice plant Capacity (tons/day)*	*Electricity consumption of (kWh/year)*
1	Devi Ice factory	12	29400

1.4.2 Operating efficiency of the existing pump

The detailed energy audits studies had been undertaken in various units of the cluster to evaluate the pump efficiencies for condenser and raw water pumps. The operating efficiency of the present condenser water pumps is found to be in the range of 30% to 40% only. The details of operating efficiency calculations of a pump installed in a typical

unit are furnished in Annexure 2.

1.5 Barriers for adoption of new and energy efficient technology / equipment

1.5.1 Technological Barriers

The major technical barriers that prevented the implementation of the energy efficient pumps in the cluster are:

- Lack of awareness of the energy efficient pumps
- Dependence on local equipment suppliers and availability of the pumps at lower cost

1.5.2 Financial Barrier

Though, the units owners has financial strength to invest, due to availability of the pumps at lower initial cost and also low maintenance cost of the pumps, the owners are attracting towards local make pumps. Further, lack of awareness of the losses and monetary benefit of energy efficient pumps also one of the major factors for implementing the energy efficient pumps.

Energy Efficiency Financing Schemes such as SIDBI's, if focused on the cluster, will play a catalytic role in implementation of identified energy conservation projects & technologies.

The cluster has significant potential for implementing energy efficiency pumps.

1.5.3 Skilled manpower

Not applicable

1.5.4 Other barrier(s)

Information on the energy efficient technologies not available among cluster unit owners, though the suppliers are available locally of energy efficient pumps, the information was not disseminated among cluster units.

2. TECHNOLOGY/EQUIPMENT FOR ENERGY EFFICIENCY IMPROVEMENTS

2.1 Detailed description of technology/equipment selected

2.1.1 Description of equipment

The project activity is replacement of condenser water pumps with new energy efficient pumps. The new pumps will have overall efficiency of more than 60%. The efficient pumps will have critically designed impellers, volute, eye and casing. The impeller is of SS material and are resistant to corrosion and scale formation.

In Ice Making Cluster, Bhimavaram, the pumps installed for ice plants have efficiencies in the range of 30 % to 40% only due to inferior design of pumps and mismatch selection and application.

Considering the above facts and for reducing electricity consumption of condenser pumps, it is suggested to install energy efficient pumps.

2.1.2 Technology /Equipment specifications

The detailed specification of the pump suggested is furnished in table 2.1 below:

Table 2.1: Energy Efficient Pump Specifications

S. No.	Parameter	Unit	Value
1	Pump Type	---	Mono Block
2	Discharge	m3/hr	25
3	Head	M	19
4	Speed	rpm	1400
5	Overall Efficiency of pump	%age	60

Further, detailed technical specifications are given in Annexure 7.

2.1.3 Justification of the technology selected & Suitability

The pumps are one of the major energy consuming equipment in Ice plants in the Cluster. Based on the detailed energy audits conducted for various pumps installed in the cluster units, the efficiency of the pumps are found to be in the range of 30 % to 40%. Whereas, the new energy efficient pumps will have overall efficiency of 60% for the same discharge and pressure of the existing pumps. The following are the reasons for selection of this technology

The following benefits are possible for selection of this technology:

- Pumps are major energy consuming equipments of the Ice plants for both raw water pumping and condenser cooling
- Pumps will reduce electricity consumption and will reduce the total operating energy cost of the plant.
- It reduces the GHG emissions

2.1.4 Superiority over existing technology/equipment

The new energy efficiency pumps are superior over the existing pumps for the following:

- Will have constant flow and pressure throughout the life of the pump
- Lower break downs due to special mechanical sealing
- Low operation and maintenance cost
- Life of the equipment is multifold than the present pumps

2.1.5 Availability of the proposed technology/equipment

The energy efficient pump suppliers are available at local level at Bhimavaram and nearby Cities. Even the supplier has taken initiative and interacting with the Ice plant owners for creating the awareness of use of energy efficient pumps in Ice plant industries. The details of the suppliers are provided in Annexure 6.

2.1.6 Source of technology/equipment for the project

The energy efficient pumps were already implemented and in operation in most of the industrial applications and running successfully. The unit owners had realized the benefit of the energy efficient pumps if implemented in the units by achieving the energy savings.

2.1.7 Service/technology providers

Details of energy efficient pumps supplier located in Bhimavaram had been furnished in Annexure -6.

2.1.8 Terms of sales

The terms and conditions of the equipment supplier for supply of energy efficient pumps are furnished in the quotation.

2.1.9 Process down time during implementation

The process down time for installation of energy efficient pump is considered at two days for dismantling the existing pump and installation of new pumps and providing electrical connections to the motor.

2.2 Life cycle assessment and risks analysis

The life of the Energy efficient pumps is considered at 15 years. There is no risk involved as the pumps are technology proven and are successfully in operation in other industries of the country.

2.3 Suitable unit/plant size in terms of capacity/production

The normal pump size required for the all the plants having production 12 TPD is 3 HP and for higher capacity Ice plants 5 HP pumping system is required.

3. ECONOMIC BENEFITS OF NEW ENERGY EFFICIENT TECHNOLOGY

3.1 Technical benefits

3.1.1 Fuel savings per year

No fuel saving is possible due to implementation of proposed system.

3.1.2 Electricity savings per year

The efficiency of proposed pumping system is more than the existing pumping system which will lead to reduction in electricity consumption. The power savings due to installation of new energy efficient pump would be 11170 kWh per annum. Details of electricity saving calculation are given at Annexure 2.

3.1.3 Improvement in product quality

There is no impact on the product quality.

3.1.4 Increase in production

There is no significant effect on production capacity.

3.1.5 Reduction in raw material consumption

Raw material consumption is same.

3.1.6 Reduction in other losses

Due to improved power factor of new energy efficient pump, the distribution losses may also reduce.

3.2 Monetary benefits

The monetary benefit due to installation of new energy efficient pump is ` 0.42 lakh per annum due to reduction in electricity consumption. Details of monetary saving calculation are furnished in Annexure 2.

3.3 Social benefits

3.3.1 Improvement in working environment in the plant

There is no significant improvement in plant working environment. However, installation of new efficient pump may minimize the breakdowns and hence working environment may improve.

3.3.2 Improvement in skill set of workers

The technology selected for the implementation is new and installation of energy efficient pump will create the awareness among the workforce on energy efficiency.

3.4 Environmental benefits

3.4.1 Reduction in effluent generation

There is no reduction in effluent generation.

3.4.2 Reduction in GHG emission such as CO_2, NOx, etc

The major GHG emission reduction source is CO_2. The technology will reduce grid electricity consumption and emission reductions are estimated at 9 tons of CO_2 per annum due to implementation of the project activity or 9 CER.

3.4.3 Reduction in other emissions like SOx

No significant impact on SOx emissions.

4. INSTALLATION OF NEW ENERGY EFFICIENT PUMP

4.1 Cost of technology/equipment implementation

4.1.1 Cost of technology/equipments

The total cost for proposed system is ` 0.29 lakh, which includes pumping system cost and other charges, taxes etc. as per the Quotation in Annexure 7.

4.1.2 Other costs

Other charges include Erection & Commissioning charges. Project cost details are furnished in Table 4.1 below:

Table 4.1: Project detail cost

Sr. No.	Particular	Unit	Value
1	New Energy Efficient pump	` in lakh	0.29
2	Erection & Commissioning	` in lakh	0.01
3	Total Investment	` in lakh	0.30

4.2 Arrangement of funds

4.2.1 Entrepreneur's contribution

The entrepreneur's contribution is 25% of total project cost, which works out at ` 0.08 lakh.

4.2.2 Loan amount

The term loan is 75% of the total project cost, which is ` 0.23 lakh.

4.2.3 Terms & conditions of loan

The interest rate is considered at 10.0% which is prevailing interest rate of SIDBI for energy efficiency related projects. The loan tenure is 3 years and the moratorium period is 3 months.

4.3 Financial indicators

4.3.1 Cash flow analysis

Considering the above discussed assumptions, the net cash accruals starting with ` 0.31lakh in the first year operation and increases to ` 1.46 at the end of sixth year.

4.3.2 Simple payback period

The total project cost of the proposed technology is ` 0.30 lakh and monetary savings due to reduction in electricity consumption is ` 0.42 lakh and the simple payback period works out to be 0.72 Years.

4.3.3 Net Present Value (NPV)

The Net present value of the investment at 10.0% interest rate works out to be ` 0.99 lakh.

4.3.4 Internal rate of return (IRR)

The after tax Internal Rate of Return of the project works out to be 107.19%. Thus the project is financially viable.

4.3.5 Return on investment (ROI)

The average return on investment of the project activity works out at 37.38%. The average DSCR is 4.21.

4.4 Sensitivity analysis in realistic, pessimistic and optimistic scenarios

A sensitivity analysis has been worked out to ascertain how the project financials would behave in different situations like there is an increase in power savings or decrease. For the purpose of sensitive analysis, two scenarios are considered are.

- Increase in power savings by 5%
- Decrease in power savings by 5%

In each scenario, other inputs are assumed as constant. The financial indicators in each of the above situation are indicated along with standard indicators.

Table 4.2: Sensitivity analysis

Particulars	*IRR* %	*NPV* ` in lakh	*ROI* %	*DSCR*
Normal	107.19%	0.99	37.38%	4.21
5% increase in power savings	112.25%	1.05	37.64%	4.40
5% decrease in power savings	102.10%	0.93	37.09%	4.02

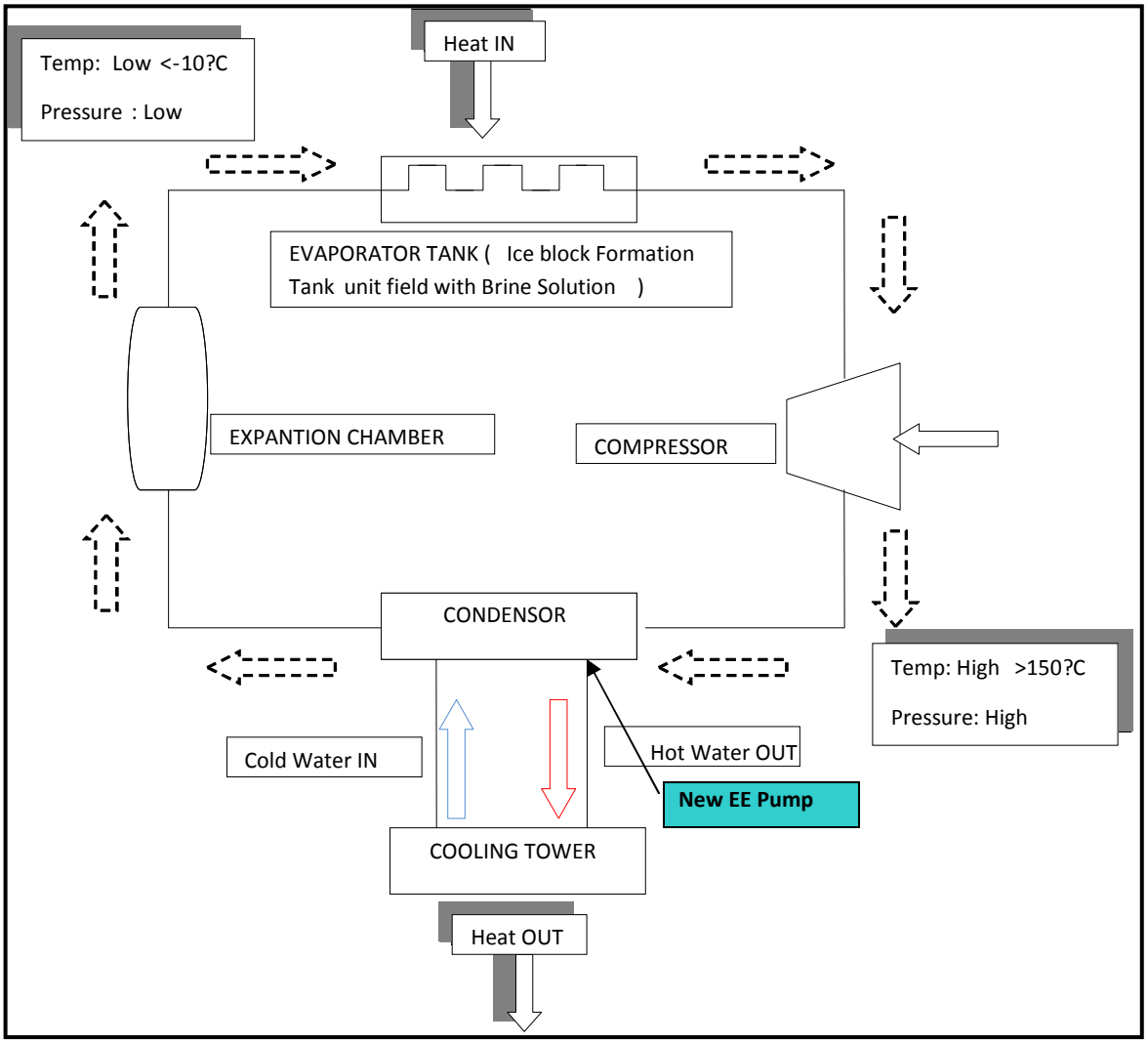
4.5 Procurement and implementation schedule

The project is expected to be completed in 1 week from the date of release of purchase order. The detailed schedule of project implementation is furnished in Annexure 5.

ANNEXURE

Annexure 1: Process Flow Diagram

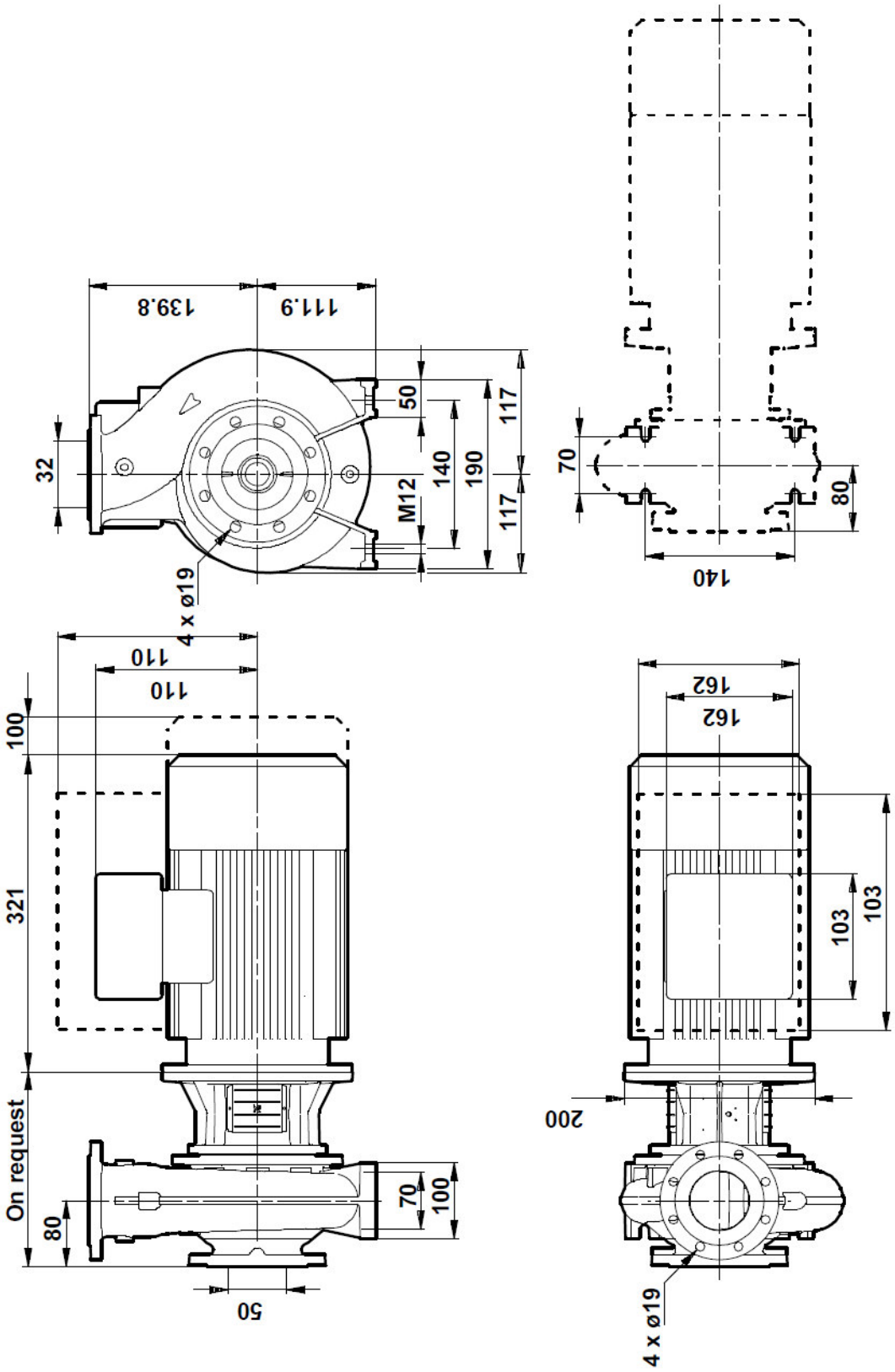
Process flow diagram will remain the same after implementation of proposed energy efficient Pump.



Annexure 2: Detailed technology assessment report – EE Pump

S.No	Parameters	Units	Existing Pump	EE Pump
1	Installed Capacity	kW	3.73	2.2
2	Head	m	19	19
3	Flow	lps	7	7
4	Flow	m3/hr	25	25
5	Efficiency of motor	%age	87	87
6	Density of water	Kg/m^3	998	998
7	Water power required	kW	1.30	1.30
8	Measured Power consumption	kW	3.50	2.17
9	Efficiency of pumping system	%age	37.20%	60.00%
10	No of Hours operation	Hrs/day	24	24
11	No of Days operation	Days/Year	350	350
12	Power Savings	kW		1.33
13	Annual power savings	kWh/year		11170
14	Power Tariff	`/kWh		3.75
15	Monetary benefit of Power Saving	` (in Lakh)/Year		0.42
16	Investment Cost	` in Lakh		0.30
17	Payback period	Years		0.72

Annexure 3: Detailed drawing for civil work required for EE Pump



Annexure 4: Detailed financial calculations & analysis

Assumptions

Name of the Technology	***Energy Efficient Pump for Condenser Water***		
Rated Capacity	***3 HP***		
Details	***Unit***	***Value***	***Basis***
Installed Capacity	HP	3	
No of working days	Days	350	
No of operating hours	Hrs	24	
Proposed Investment			
Plant & Machinery	` (in lakh)	0.29	
Panel, Switch & Cabling etc.	` (in lakh)	0.01	
Total Investment	` (in lakh)	0.30	
Financing pattern			
Own Funds (Equity)	` (in lakh)	0.08	Feasibility Study
Loan Funds (Term Loan)	` (in lakh)	0.23	Feasibility Study
Loan Tenure	Years	3.00	Assumed
Moratorium Period	Months	3.00	Assumed
Repayment Period	Months	39.00	Assumed
Interest Rate	%age	10.00%	SIDBI Lending rate
Estimation of Costs			
O & M Costs	% on Plant & Equip	2.00	Feasibility Study
Annual Escalation	%age	5.00	Feasibility Study
Estimation of Revenue			
Electricity Saving	kWh/Year	11170	
Cost of electricity	`/kWh	3.75	
St. line Depn.	%age	5.28	Indian Companies Act
IT Depreciation	%age	80.00	Income Tax Rules
Income Tax	%age	33.99	Income Tax

Estimation of Interest on Term Loan **`(in lakh)**

Years	***Opening Balance***	***Repayment***	***Closing Balance***	***Interest***
1	0.23	0.02	0.20	0.03
2	0.20	0.06	0.14	0.02
3	0.14	0.12	0.02	0.01
4	0.02	0.03	-0.01	0.00
		0.23		

WDV Depreciation **` (in lakh)**

Particulars / years	***1***	***2***
Plant and Machinery		
Cost	0.30	0.06
Depreciation	0.24	0.05
WDV	0.06	0.01

Projected Profitability **`(in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***
Fuel savings	0.42	0.42	0.42	0.42	0.42	0.42
Total Revenue (A)	0.42	0.42	0.42	0.42	0.42	0.42
Expenses						
O & M Expenses	0.01	0.01	0.01	0.01	0.01	0.01
Total Expenses (B)	0.01	0.01	0.01	0.01	0.01	0.01
PBDIT (A)-(B)	0.41	0.41	0.41	0.41	0.41	0.41
Interest	0.03	0.02	0.01	0.00	0.00	0.00
PBDT	0.39	0.40	0.40	0.41	0.41	0.41
Depreciation	0.02	0.02	0.02	0.02	0.02	0.02
PBT	0.37	0.38	0.39	0.40	0.40	0.40
Income tax	0.05	0.12	0.14	0.14	0.14	0.14
Profit after tax (PAT)	0.32	0.26	0.25	0.26	0.26	0.26

Computation of Tax **`(in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***
Profit before tax	0.37	0.38	0.39	0.40	0.40	0.40
Add: Book depreciation	0.02	0.02	0.02	0.02	0.02	0.02
Less: WDV depreciation	0.24	0.05	-	-	-	-
Taxable profit	0.15	0.35	0.40	0.41	0.41	0.41
Income Tax	0.05	0.12	0.14	0.14	0.14	0.14

Projected Balance Sheet **`(in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***
Share Capital (D)	0.08	0.08	0.08	0.08	0.08	0.08
Reserves & Surplus (E)	0.32	0.58	0.83	1.09	1.34	1.60
Term Loans (F)	0.20	0.14	0.02	-0.01	-0.01	-0.01
Total Liabilities (D)+(E)+(F)	0.60	0.80	0.93	1.16	1.41	1.67
Assets	**1**	**2**	**3**	**4**	**5**	**6**
Gross Fixed Assets	0.30	0.30	0.30	0.30	0.30	0.30
Less Accm. Depreciation	0.02	0.03	0.05	0.06	0.08	0.10
Net Fixed Assets	0.28	0.27	0.25	0.24	0.22	0.20
Cash & Bank Balance	0.31	0.53	0.68	0.92	1.19	1.46
TOTAL ASSETS	0.60	0.80	0.93	1.16	1.41	1.67
Net Worth	0.40	0.66	0.91	1.16	1.42	1.68
Debt Equity Ratio	2.68	1.88	0.28	-0.12	-0.12	-0.12

Projected Cash Flow

` (in lakh)

Particulars / Years	***0***	***1***	***2***	***3***	***4***	***5***	***6***
Sources							
Share Capital	0.08	-	-	-	-	-	-
Term Loan	0.23						
Profit After tax		0.32	0.26	0.25	0.26	0.26	0.26
Depreciation		0.02	0.02	0.02	0.02	0.02	0.02
Total Sources	0.30	0.34	0.28	0.27	0.27	0.27	0.27

Application							
Capital Expenditure	0.30						
Repayment Of Loan	-	0.02	0.06	0.12	0.03	0.00	0.00
Total Application	0.30	0.02	0.06	0.12	0.03	0.00	0.00
Net Surplus	-	0.31	0.22	0.15	0.24	0.27	0.27
Add: Opening Balance	-	-	0.31	0.53	0.68	0.92	1.19
Closing Balance	-	0.31	0.53	0.68	0.92	1.19	1.46

IRR **` (in lakh)**

Particulars / months	***0***	***1***	***2***	***3***	***4***	***5***	***6***
Profit after Tax		0.32	0.26	0.25	0.26	0.26	0.26
Depreciation		0.02	0.02	0.02	0.02	0.02	0.02
Interest on Term Loan		0.03	0.02	0.01	0.00	-	-
Cash outflow	(0.30)	-	-	-	-	-	-
Net Cash flow	(0.30)	0.36	0.29	0.28	0.27	0.27	0.27
IRR	107.19%						
NPV	0.99						

Break Even Point **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***
Variable Expenses						
Oper. & Maintenance Exp (75%)	0.00	0.00	0.00	0.01	0.01	0.01
Sub Total*(G)*	0.00	0.00	0.00	0.01	0.01	0.01
Fixed Expenses						
Oper. & Maintenance Exp (25%)	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Term Loan	0.03	0.02	0.01	0.00	0.00	0.00
Depreciation *(H)*	0.02	0.02	0.02	0.02	0.02	0.02
Sub Total (I)	0.04	0.03	0.03	0.02	0.02	0.02
Sales (J)	0.42	0.42	0.42	0.42	0.42	0.42
Contribution (K)	0.41	0.41	0.41	0.41	0.41	0.41
Break Even Point (L= G/I)	10.42%	8.40%	6.31%	4.32%	4.27%	4.30%
Cash Break Even {(I)-(H)}	6.59%	4.57%	2.49%	0.49%	0.44%	0.46%
Break Even Sales (J)*(L)	0.04	0.04	0.03	0.02	0.02	0.02

Return on Investment **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***Total***
Net Profit Before Taxes	0.37	0.38	0.39	0.40	0.40	0.40	2.33
Net Worth	0.40	0.66	0.91	1.16	1.42	1.68	6.22
							37.38%

Debt Service Coverage Ratio **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***Total***
Cash Inflow							
Profit after Tax	0.32	0.26	0.25	0.26	0.26	0.26	1.09
Depreciation	0.02	0.02	0.02	0.02	0.02	0.02	0.06
Interest on Term Loan	0.03	0.02	0.01	0.00	0.00	0.00	0.05
Total (M)	0.36	0.29	0.28	0.27	0.27	0.27	1.20

DEBT

Interest on Term Loan	0.03	0.02	0.01	0.00	0.00	0.00	0.05
Repayment of Term Loan	0.02	0.06	0.12	0.03	0.00	0.00	0.23
Total (N)	0.05	0.08	0.13	0.03	0.00	0.00	0.29
	7.28	3.81	2.14	8.98	0.00	0.00	4.21
Average DSCR (M/N)	4.21						

Annexure 5: Details of procurement and implementation plan

Project Implementation schedule

S. No	Activity	Days						
		1	2	3	4	5	6	7
1	Placement of Orders for Equipment							
2	Supply of pump							
3	Installation of the pump & motor							
4	Trial runs							

Process down time

S.No	Activity	Days	
		6	7
1	Dismantling of the existing pump		
2	Electricity connections and modification of the pipe lines		
3	Installation of the pump		
4	Trial runs		

The process down time is considered for only two days.

Annexure 6: Details of technology/equipment and service providers

Equipment details	*Source of technology*	*Service/technology providers*
Energy Efficient Pump	--	Grundfos Pumps India Private Limited Plot No.5,H.No7-1-28/1/5, Park Avenue Colony, Divya Shakthi Appt Road, Hyderabad- 500016 Telefax:040-23731014,23731015

Annexure 7: Quotation or techno-commercial bid

Ref : GIN/RS/001/10-11
Dt : 05.12.2011

M/s. APITCO
HYDERABAD

Kind Attn: Mr. Sudeesh

Dear Sir,

Sub: Requirement of Grundfos make Centrifugal Pump.

Ref : Discussions had with the undersigned.

* * *

We thank you very much for the above enquiry. With reference to the above, we are pleased to offer Grundfos make and Maintenance free centrifugal Pump for your consideration. We enclose herewith our technical and commercial offer for you kind perusal.

ANNEXURE -I

S.No	DESCRIPTION	Item No.1
01	Make	G R U N D F O S
02	Application	Sump to OHT
03	Liquid Handled	Water
04	Pump Model	**NB 32-125/130**
05	No. Of Stages	Single
06	Type of pump	Horizontal
07	Qty	1
08	Pump Inlet /Outlet	DN 50/32
09	Flow	25 m3/hr
10	Head	19.2 m
11	Operat temp. of liquid	0 TO 120 deg C
12	Rated Speed	2900rpm
13	Type of Seal	Mecahnical Seal
14	Motor Rating	2.2KW/ 3HP
15	Make of motor	Hebei ,EFF2
16	Type of motor	TEFC Sq. Cage motor
17	Voltage / Frequency	3X380-415 /50
18	Phase	Three Phase
19	MOC	CI/SS304
	Impeller	Bronze
20	Pipe Connections	DIN Flanges
	Unit Price in Rs.	28,055.00
	25% Discount	21045.00
	Including VAT@4%	21882.00

BE›THINK›INNOVATE›

GRUNDFOS

Terms & Conditions :

Prices	:	FOR HYDERABAD
Taxes	:	VAT Extra @ 4%
Delivery	:	Within 4-6 Weeks from the date of receipt of technically and commercially clear purchase order
Payment	:	20% advance and balance against proforma invoice.
Validity	:	30 Days

Note: Any Statutory Levy at the time of supply is to your account.

Trust our offer is in line with your requirement and now look forward to receive your valuable purchase order at the earliest.

Thanking you and assuring you of our best services at all times,

Yours truly,
For Grundfos Pumps India Pvt. Ltd.,

Supriya.R
Sales Coordinator- Central India
040-23731014/15
9963007733
supriya@grundfos.com

GRUNDFOS

Company name: -
Created by: -
Phone: -
Fax: -
Date: -

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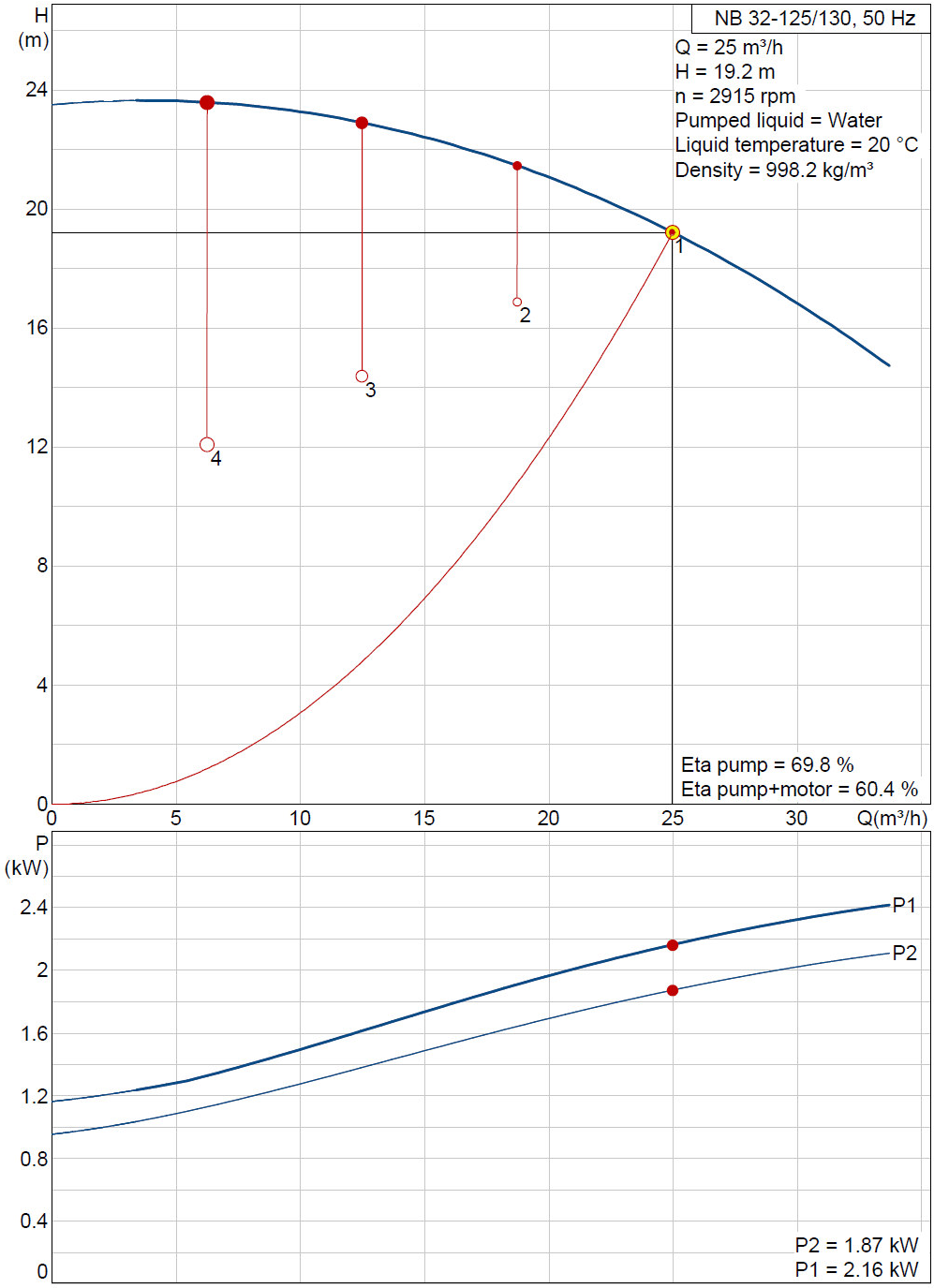

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