

EXCEL INDUSTRIES LIMITED
Roha, Dist. Raigad (Maharashtra)

Unit Profile

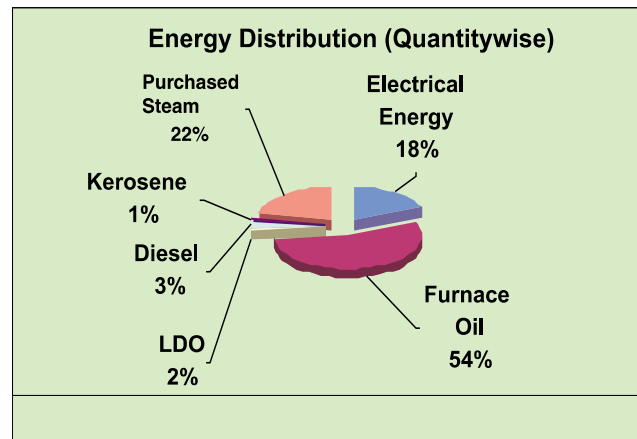
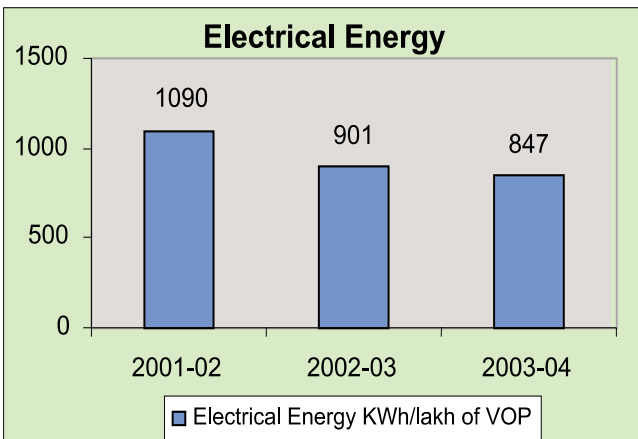
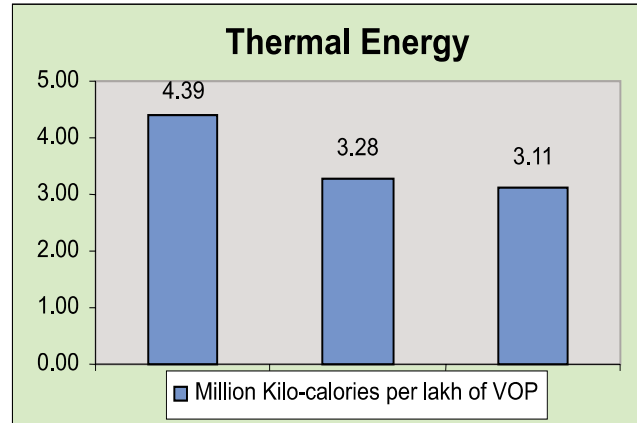
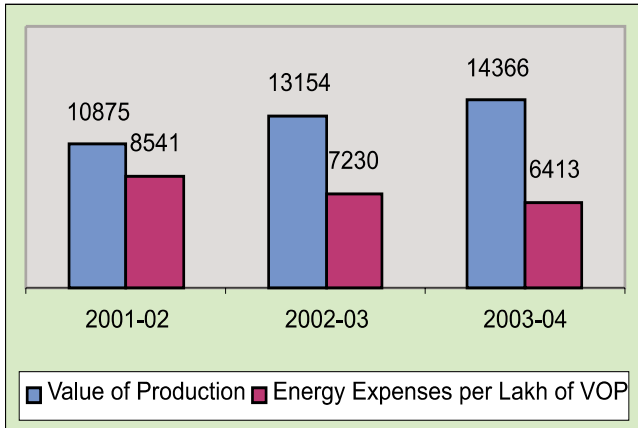
Excel Industries Limited, Roha is a pioneer in the field of manufacturing industrial chemicals, intermediates, speciality chemicals and agricultural chemicals and leading global manufacturer of Di-ethyl Thiophosphoryl Chloride, Phosphorous Pentasulphide and Glyphosate. Although Excel has a very diversified range in chemicals manufacturing, our main strength lies in chlorine & phosphorous based chemicals.

Excel Industries Limited, Roha unit was started in 1975 with the production of Phosphorous Trichloride. Since then several exapnsions were carried out with increase in the product range. Presently twelve industrial & agrochemicals are being manufactured at Roha unit. With this utility installations also underwent major expansions.

Energy Consumption

Energy Expenses as compared to Value of Production

Decsription	Unit	2001-2002	2002-2003	2003-2004
Value of Production	Rs Lakhs	10875	13154	14366
Electrical Energy	Lakhs KWH	118-51	118-52	121-71
Thermal Energy	MKcal	47786	43092	44607
Total Energy Bill	Rs- Lakhs	930-91	951-06	921-97
Energy expenses Per lakh of VOP	Rs-	8560	7230	6413
Energy expenses as a % of Value of Production	%	8-56	7-20	6-41
Reduction in energy expenses compared to previous year	Rs Lakhs	-	175.5	116.7



Energy Conservation Commitment, Policy and Set up

Excel considers Energy Conservation as a measure not only to increase the productivity, but also a tool to deliver its responsibilities towards society and a nation. This, as its policy statement suggests, can be made possible through the involvement of all the members of Excel family as well as active participation & support from the top management.

Energy consumption against the target values is reviewed by top management every month. Energy conservation measures planned, its progress are discussed and reviewed. Quarterly ENCON meeting is conducted in which cross-functional teams from all our sites, including corporate representatives participate. Past performance & future course of actions are decided in these meetings.

Energy Policy

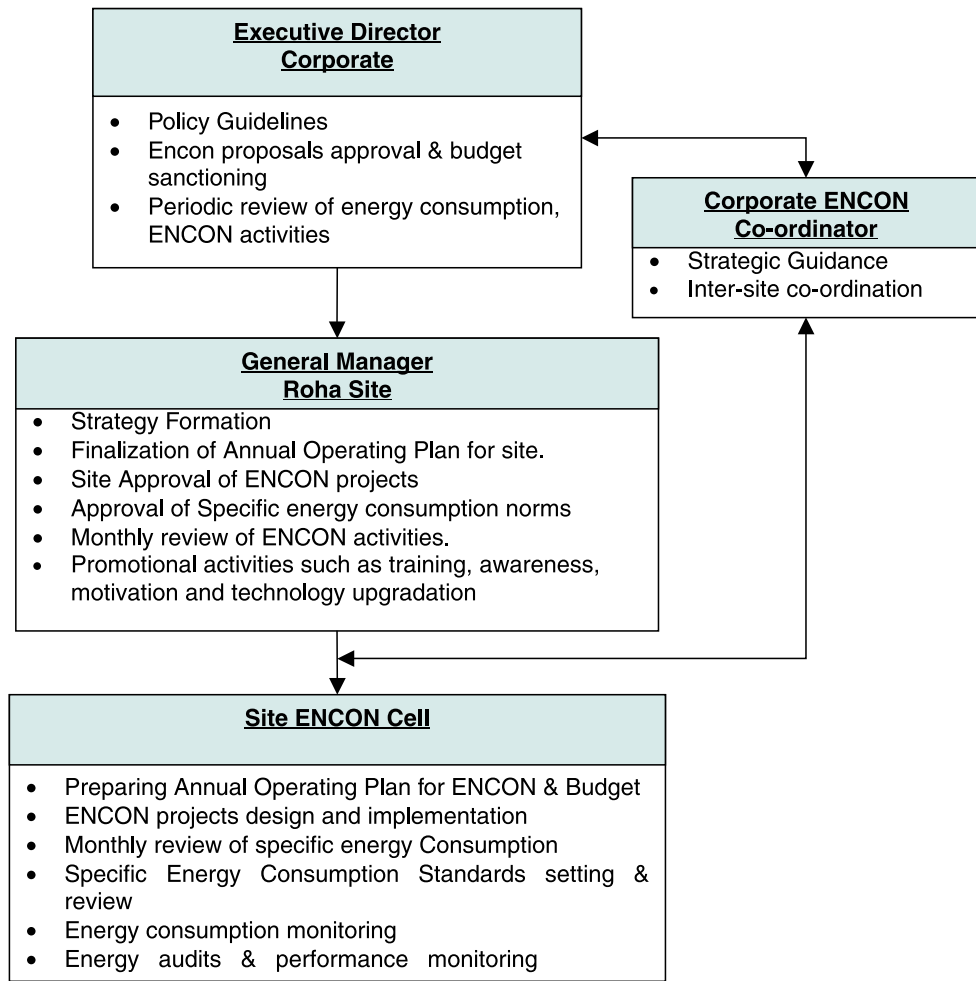
EXCEL INDUSTRIES LIMITED ENERGY MANAGEMENT POLICY

We, at Excel Industries Limited, are committed to conserving energy and natural resources in all our processes and activities:

We shall accomplish it through:

- Enhancing awareness of all members of Excel family towards energy and resource conservation and building competence to conserve through appropriate training.
- Maintaining Energy Conservation Cell to coordinate Encon activities:
 - o Through review of monitoring and reporting systems and modifications.
 - o Providing common platform for information sharing, comparing energy consumption norms within the organisation, with neighbours and with international norms.

The Energy Management Organization is as follows:



Energy Conservation Achievements

Reduction in Effective rate of Electricity from Rs. 3.72 per unit to Rs. 3.52 per Unit

When MSEB, electricity supply utility, introduced electricity tariff structure based on Time of Day (TOD) and PF incentives, Excel,Roha took this as a opportunity, to reduce its cost of electricity by taking benefits of incentives & improving demand side management.

The results are as below:

This effective reduction could be achieved due to

- Fixing a target for electrical as well as production department and bringing awareness to the actual users about rising electrical costs.
- Scheduling production schedules & rearranging process loads to take the benefit of TOD.
- Scheduling operations to optimum capacity to reduce M.D.
- Improvement in Power Factor from 0.94 to 1 and reduction in cable losses by adding capacitors at the load end.
- Regular analysis & monitoring of electrical consumption.
- Optimizing plant capacities using KAIZEN technique.
- Reduction in wastages / non value adding activities.

Description	Unit	2001-02	2002-03	2003-04
Value of Production	Rs. Lakhs	10875	13154	14366
Average M.D.	KVA	2128	2085	2050
Average Loading	KVA	0.623	0.632	0.663
Electrical Consumption	KWh	116,09,070	115,39,185	119,11,252
Consumption per Lakh of VOP	KWh	1068	877	829
Electricity Bill	Rs	458,81,424	428,81,873	419,83,215
Electricity Charges per lakh of VOP	Rs	4238	3249	2922
Average Rate of Electricity	Rs/ KWh	3.95	3.72	3.52
Annual Savings	Rs	Reference	26,54,000	51,21,840

Optimization of product feed rate to achieve energy efficiency

General practice of operation in Sulfex plant was to operate two micronizers with three air compressors. Although facilities existed for operating three micronizers simultaneously, air supply was not sufficient to get desired product quality.

After careful study of the product feed rate for micronizing and air compressor loading, it was decided to install one smaller micronizer as a third unit. This system gave the following results:

Reduction in power consumption in 2003-2004
= 1,51,724 KWh

Savings Achieved in 2003-2004 = Rs. 5,46,220



Reduction in Steam Wastages

Theoretical amount of steam wastages was calculated after careful study of steam generation & distribution, survey of header insulation & steam traps and several efforts, as listed below, were taken to reduce the amount of actual steam wastages.

Theoretical amount of steam wastage (amount of steam unavailable for process) was calculated as below:

Based on 4000 MT steam generation per month

Sr	Description	Qty/month	% of Total	Remarks
1	Condensation losses through headers	270 MT	6.75 %	Standard losses at 80 % insulation efficiency (Ref J.N. Marshall Handbook)
2	Blowdown	50 MT	1.25 %	Considering COC of 29 for 3000 ppm of drum water
3	Feed Water Preheating	155 MT	4.0 %	Considering 60 % condensate recovery.
	Total	475 MT	12 %	

The actual amount which was not available for process is listed below :

Month	Steam Consumption (MT)	Losses (MT)	% of Total Steam
2002-2003	39,747	6,257	15.7
2003-2004	51,961	6,453	12.4

Savings in steam losses = $51961 \times (0.157 - 0.124) = 1715 \text{ MT}$

Savings in Rs. = Rs. 16,29,250 per annum

Efforts taken for reduction in wastages are as follows:

- Audit of steam traps to take corrective action on faulty steam traps (As on today 24 faulty traps identified & corrected)
- Daily monitoring of HP steam headers for any leakages, keeping data on leakages and taking corrective actions as early as possible. (143 leakages identified and corrected)
- Eliminating flange joints with butt welded joints wherever possible (So far, 56 flange joints eliminated)
- Replacement of conventional asbestos gland packings of steam valves with extruded PTFE packings.
- Regular survey of insulation condition & steam leakages

Process modification to achieve energy conservation

About 40 % of an Intermediate being produced at Roha unit is consumed captively, while rest is being sold / exported. Final product is distilled at a very high temperature (above 500°C). The end use process where this product is used as a raw material at Roha site was optimized by various trials & process modifications to enable us to use undistilled product as a raw material without affecting quality & efficiency of the process. This has helped the unit in achieving savings not only in energy costs, but substantial reduction achieved in operating and maintenance cost also.

	Projected for 04-05	Actual upto May 04
Captive consumption per year	3825 MT	550 MT
Average F.O. Consumption per MT of distilled product	40 Litres/MT	
F.O. Consumption for captive consumption for distilled product	1,53,000 Litres	22,000 Litres
Savings in Rs (@ Rs 10.9 per litre of F.O.)	Rs. 16,67,700	Rs. 2,86,000



Provision of mechanical seals for Cooling Water transfer pumps in place of gland packings:

By replacing conventional gland packings in stuffing box, which causes frictional resistance to the pump shaft, with mechanical seals, has helped us in reduction in current drawn by pump motor; in addition to elimination of Asbestos Gland Packings.

Pump Description	Motor Current drawn (Amperes)		Expected Annual Savings (24 hrs/day, 300 days/year)	
	With gland packing	With Mech. Seal	Unit /year (KWh)	Rs. /year
DETC I C.W. Circulation Pump	58	55	13,960	50,245
Aqueous Distillation C.W. Circulation Pump	45	40	23,260	83,741
HCl Scrubber C.W. Circulation Pump	33	30	13,960	50,245
Vapor Absorpyion Unit C.W. Circulation Pump	64	60	18,609	66,990
160 TR Refrigeration Unit C.W. Circulation Pump	62	58	18,609	66,990
76 TR Refrigeration Unit C.W. Circulation Pump	34	30	18,609	66,990
Total			107,007	385,201



Expected Savings	3,85,200
Investment for mechanical seals	1,18,000
Payback	4 months

Thyristor Controllers for Electrical Heaters

In one of its plants, process requirement compels to use electrical heaters to maintain temperature of process pipelines & certain equipment between 400 to 500 °C. Earlier practice of controlling the temperature by ON/OFF method using electronic timers was inefficient.,as some heaters use to remain ON even if specified temperature is reached. With the use of thyristor controllers, which take temperaure as a feedback and regulate power supply to heaters, it was possible to save energy as well as accurate control of process temperature was made possible.

Details of savings achieved are as follows:

Installed Heaters Capacity : 80 KW
 Average yearly production of undistilled product : 3825 MT
 Plant actual running hours for producing 3825 MT : 5100 Hours
 Electrical consumption on heaters with timer control : 3,40,000 KWh
 (Based on 50 secs ON/10 secs OFF per minute)

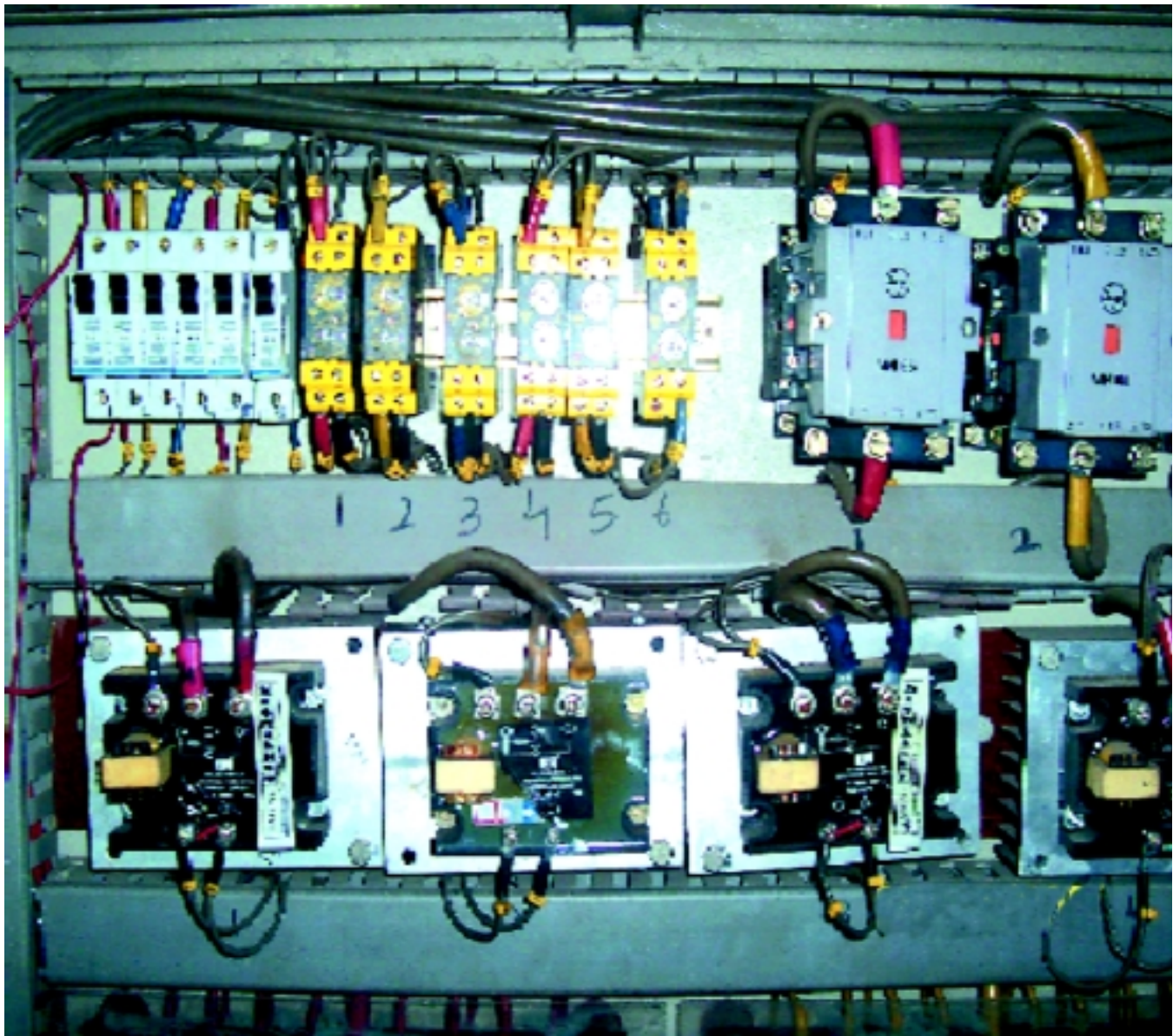
Expected electrical consumption with thyristor Controller : 2,85,600 KWh
 (Based on actual reading taken for 1 month)

Expected Savings for 2004-05 in electrical consumption per year : 54,400 KWh

Expected Savings for 2004-05: : Rs. 1,95,840

Investment on Thyristor : Rs. 60,000

Payback : 3.5 months



Installation of Cooling Tower Fan Controller

All induced draft cooling tower fans run irrespective of the cooling tower outlet temperature. In a case where C.T. capacity is sufficient & seasonal changes such as low WBT & low RH, continuous running of C.T. fan may not be necessary. Keeping this in view, the unit has installed Temperature Controller to C.T. Fan which turns off the Fan motor when specified temperature (set limit 30°C) is reached at cooling tower outlet and turns on when specified temperature limit (31°C) is reached. The controller is having in-built time totalizer which indicates the total time fan was off.

After installation, substantial savings achieved during winter season.

Actual power drawn by C.T.Fan motor = 11.6 KW + 14.2 KW

Actual off hours during 2003-2004

= 1163 Hrs + 2260 Hours

Actual Savings achieved in 2003-2004

= 13523 KWh + 32092 KWh = **Rs. 1,64,200**



Energy Conservation Plans and Targets

Energy Conservation Measures (Planned)	Anticipated savings in		Approx. investment (Rs.lakhs)	Project Commencement & Completion year	
	Energy Value M Kcal	Rs. lakhs		Start	Completion
Enhancing the steam to fuel ratio of boiler from 13.09 (avg of 2003-04) to 13.80	2060	21	5.00	Oct 2004	Apr 2005
Increase in condensate recovery from present 50% to 75%.	793.1	8.39	4.00	Oct 2004	Jan 2005
Replacement of vapour absorption chilling unit with vapour compression unit	3664	33.00	40.00	Mar 2005	April 2005
Increasing P2S5 furnace efficiency from present 25% to 40%	1287.5	13.65	10.00	Oct 2004	Dec 2004
Reduction of at least 100 KW in Cooling Water pumping power with optimization of flow/head and replacing lower efficiency pumps with higher efficiency pumps	639	26.00	6.00	Aug 2004	Nov 2004
Replacement of low efficiency Worm Reduction Gearboxes with high efficiency Helical gear boxes.	241	9.80	5.0	Dec 2004	March 2005
Performance analysis and energy balance of major energy guzzlers.	To calculate after completion of the exercise			Mar 2004	Dec 2004
Direct expansion of ammonia in vessel jackets instead of indirect cooling by Calcium Chloride brine solution.	186	7.56	6	Dec 2004	Jan 2005
Designing & implementation of scheme for Survey & suggestions for employees to achieve energy conservation at domestic level	To discharge our responsibility towards society.			Oct 2004	March 2005
TOTAL	8870.6	119.40	76.00		

Environment

Excel is known for its commitment towards environmental excellence and safety. The company has installed well equipped Effluent Treatment Plant along with Bio-reactors and incinerators. The company has successfully implemented Environment Management System and certified for ISO-14001 since January 2003.

Company has installed facilities for effluent treatment in terms of primary & secondary treatment. Extended aeration with activated sludge is carried out and outgoing effluent is aerated in polishing aerator to meet disposal norms of consent given by Maharashtra Pollution Control Board.

Adequate scrubbing systems has been provided for all scrubbing gases. In fact, bi-products like NaHS, HCl & Ortho-phosphoric acid generated by scrubbing of waste gases are being sold or utilized on site.

Stack monitoring and work area monitoring data indicates our scrubbing efficiencies to be better than stipulated norms. The company meets all the requirements of existing consent for air, water and hazardous waste.

Safety

Safety is a prime consideration in Excel. A well-equipped Safety department headed by trained safety professionals is maintained to look after implementation of Factories Act, conduct regular meetings and training of employees, contractors & transport workers. We have a practice of annual internal audit carried out by peer group from different sites of the company.

Special attention is paid to occupational health. Complete health record of all employees of site is available. Health monitoring & counseling is practiced. There have been no reportable accidents in last three years.

In addition to above, the company has installed an EHS system in order to deliver its commitments towards Environment, Health and Safety. The EHS system has following 16 components and each component is monitored by the steward assigned for that component.

SL NO	EQUIPMENT	DISCHARGE TEMPERATURE (DEGREE C)	NO OF HRS OF OPRATION	EXPECTED YIELD OF H.W./DAY
1	BOILER	220	11	6000
2	AMMONIA COMPRESSORS	114	18	8000
3	AIR COMPRESSOR	125	8	4000
4	HOT WATER GENERATOR	235	4	2000