

Make the most of your energy™

Energy Efficiency in Buildings

Why Energy Efficiency in Buildings

- High cost of Electricity – Tariff for Commercial Buildings charged by EBs is in the highest category.
- Likelihood of further enhancement in tariff as the states are facing shortages and buying power at very high rates
- Major Consumption is in Air conditioning – Maximum savings possibilities are also in AC.
- Lighting consumption very high – Savings are relatively easy to achieve.
- Diesel Generation cost rising continuously as fuel cost is rising.

Factors Relevant for Buildings

- Common area energy cost is high
- High Maintenance cost
- High failure rate of luminaires
- No check on the energy consumption in common areas and own premises
- Failure of electronic equipment
- No expertise on energy consumption and cost analysis
- No analysis being done for improving Energy Equipment performance

Factors Relevant for Facility Manager of Commercial Complexes

- Manual collection of consumption data
- Consumers' presence and co-ordination is required for collection of data on energy consumption
- Disagreement of energy consumption by consumers.
- Cumbersome to prepare bills
- Difficulty of obtaining run hours of equipment for maintenance.
- No check on diesel consumption.

We are
the global specialist in
energy management

A world where we can all
**achieve more while
using less**
of our common planet

Helping people make the most of their energy



A Global Company

INR 119,450 crore revenue in 2009

114,000 people in more than 100 countries

>200 factories around the world

R&D centres in **25 countries**

Schneider Electric in India

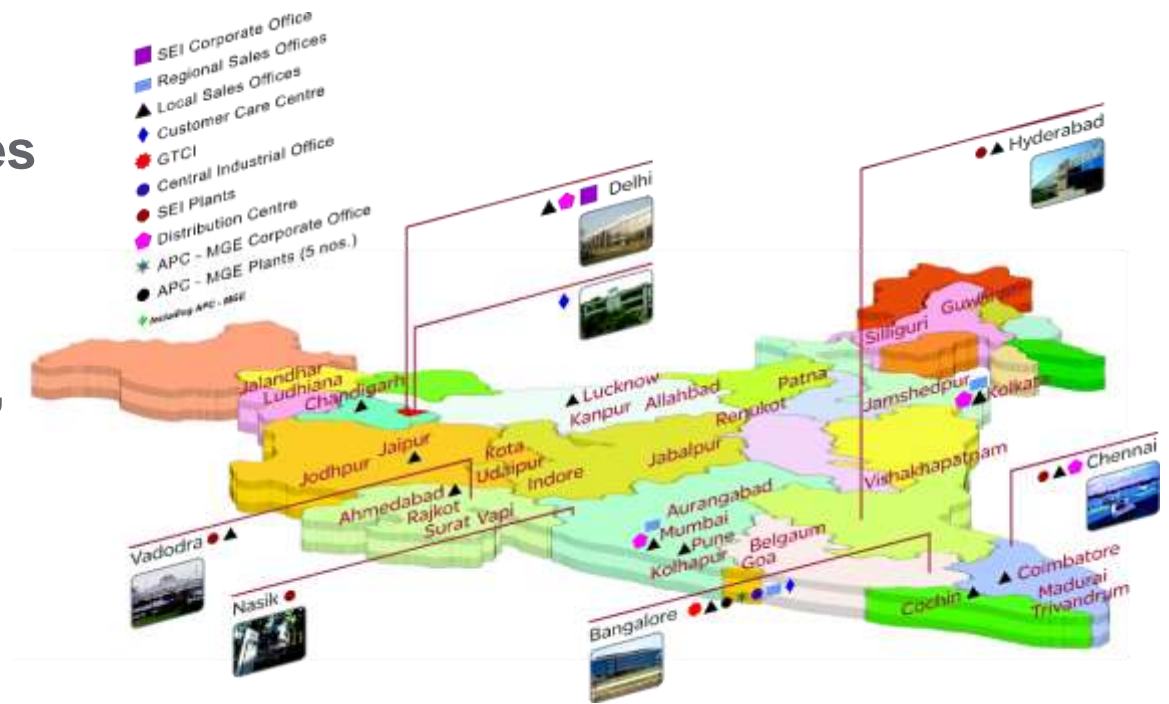
6,500 employees

9 manufacturing sites,

6 R&D centers

400 authorized partners (Distributors, System Integrators and Panel Builders)

One Regional Project & Engineering Centre



Schneider Electric + Conzerv + Meher Capacitors = EE^{3*}

* Energy Efficiency

Energy Conservation Act 2001

Energy Conservation Building Code

Energy Conservation Building Code - Applicability

- **Applicability for Buildings having**
 - > **Connected load of 500 KW or contract load of 600 KVA**
 - > **Floor Area over 1000 sq m**
- **Code applies to**
 - > **HVAC**
 - > **Exterior and Interior Lighting**
 - > **Electrical Power and motors**
- **Code exempts**
 - > **Factory buildings**
 - > **Single family buildings**
 - > **Multi family buildings of three stories or less**

ECBC – HVAC Requirements

- Equipment Efficiency are specified :

- > Air cooled air conditioners 5 tons and above -

COP 2.93 to 3.08

- > Water cooled air conditioners 5 tons and above –

COP 3.22 to 4.10

- > Air cooled chillers 150 tons above -

COP 2.95<>3.05

- > Centrifugal water cooled chillers- 150 to 300 –

COP <5.80>6.30

ECBC - HVAC

- > Reciprocating compressor water cooled chiller all sizes – COP 4.20
- > Rotary screw & scroll compressor water cooled chiller 150 – 300 tons
COP < 4.70 > 5.40 > 5.75
- Performance tables for Heat pumps, furnaces and boilers
- HVAC Controls, duct insulation and sealing.

ECBC - Lighting

- Lighting controls

- Automatic shutoff for interior lighting in buildings above 500 sqm
- Occupancy sensors for areas above 30 sqm such as conference/meeting rooms, class rooms, storage spaces etc.
- Other spaces with programmed timers or occupancy sensors
- Luminaire controls in day-lighted areas.

ECBC - Lighting

- Interior Lighting power density specified:

- By Building Area method in Watts per sqm

(eg. Library, Theatre, Hotel etc)

- By Space Function method in Watts per sqm (eg. Seating,

Operating room etc)

- Method of wattage calculation for installed interior lighting

- Exterior lighting power specified in table

ECBC – Electric Power

- Transformers: Losses for 11KV and 22KV transformers are specified for capacities ranging from 100 KVA to 1000 KVA.
- Motors: Energy efficiency for 1.5 HP to 100 HP motors are specified.
- Power factor correction
- Metering: Over 1000 KVA meters should measure demand(KVA), energy(KWH), PF, Phase current, voltage(line and phase) and THD. Below 1000KVA measure KW, KWH and PF
- T & D losses not to exceed 1 %

ECBC

- Lighting:

- > Automatic Light Shutoff
- > Space control
- > Interior Lighting Power Density(LPD) in Watts/sqm
- > Exterior Lighting norms

- Electric Power:

- > Transformer – max losses specified
- > Motors – min acceptable efficiency
- > Power Factor correction & energy monitoring

Common Problems in Buildings

- Large percentage of energy in air conditioning followed by lighting.
- Usage of florescent tubes and CFLs results in low PF.
- Unrelated load consuming areas result in exceeding sanctioned demand
- Huge differences in per unit charges when supply is from EB or DG.
Need for separate billing for consumers

Products for Buildings and Commercial Complexes

ACCREDITATION

CONZERV is accredited for Energy Audit by Bureau of Energy Efficiency, Ministry of Power, Govt of India under Energy Conservation Act 2001

Dual Source Energy Meter - Features

- Measures
 - W
 - DG, EB, Total Wh, On.hrs, OLD
- 96 X 96 construction
- Bright LED display, %A Load Bar
- No CLR – only thru EBS
 - Wh Readings retained
- New Key Lock function
 - Press < + > Keys – Toggles Lock
 - 2 + 16 sec Display for W
- Turbo key – One Touch
 - Wh.EB, Wh.DG directly
- RS485 option
- EBS Software
 - e Billing



Dual Source Energy Meter -Benefits

- OLD register to view last Energy readings
- Can view separately the duration of EB/DG On hrs
- Total Energy and ON hours
- Overload Detection thru %A Load Bar
- 3 phase and Phase-wise power
- CT Rev auto correction (since no IE), wiring check
- Gen smart-sense
 - 8-300v AC/DC. Can sense 24V DC, 230V AC

Dual Source Energy Meter - Applications

- Townships/apartments
- Shopping Malls/Commercial complexes
- Hotels
- Any Installation which requires split energy monitoring for two conditions
 - e.g.- Running & Idle
 - Enabled by Smart Sense

Solution – Energy Billing System

- Meters to be installed for all consumers on supply panel usually located in Facility Manager's area.
- All common areas, elevators, lifts etc to be separately monitored.
- Energy balancing and reconciliation between EB supply and consumer billing to be carried out daily.

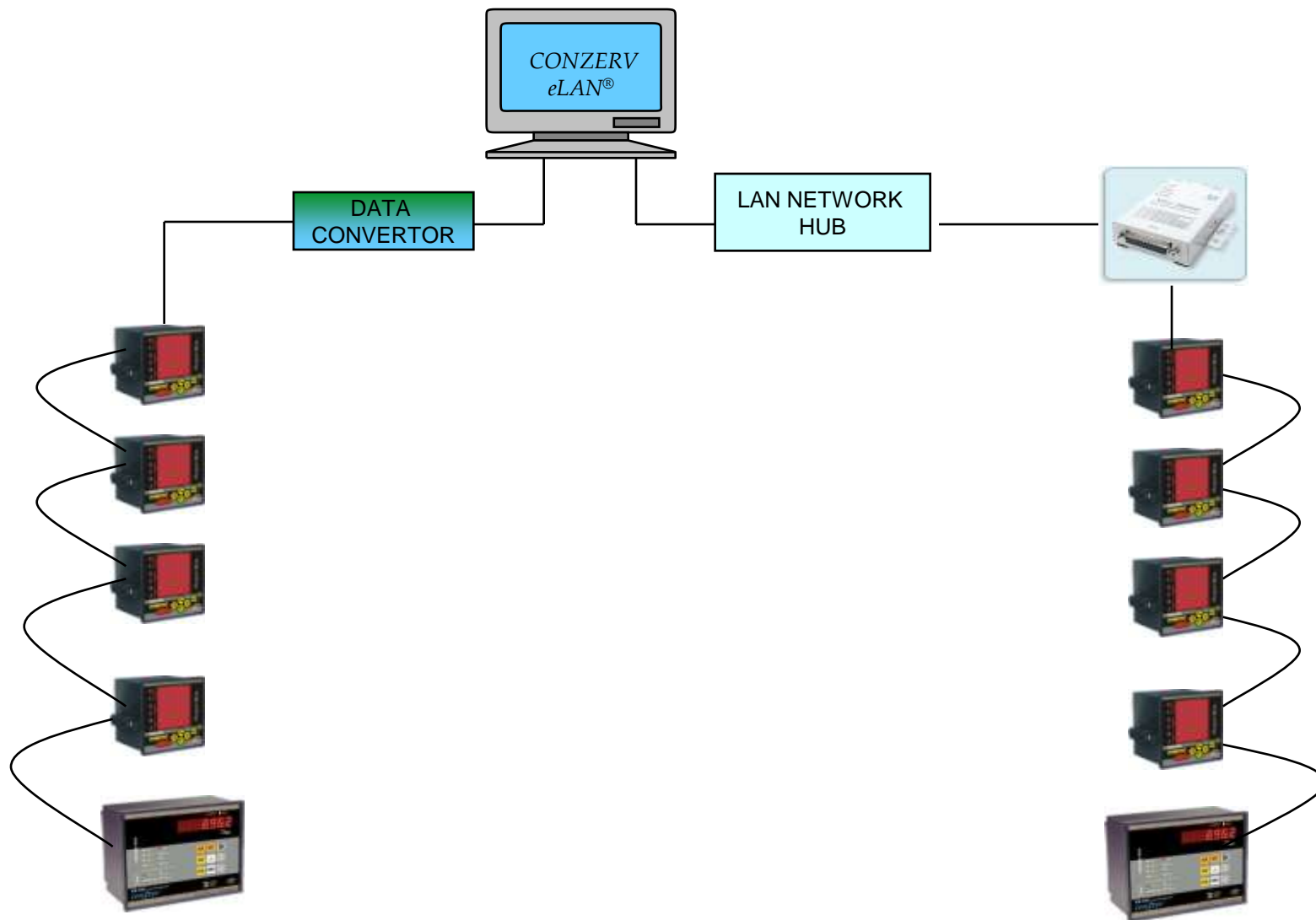
Instrumentation for Measurement



Stand-Alone Meters are not enough

- Generally provide only Raw Data
- Readings cannot be correlated on-line, in Real-Time
- Difficult to relate Energy Consumption to actual usage of facility
- Optimisation requires On-Line Data. Difficult to achieve with Stand-Alone Instruments.

Energy Management & Billing System



EM 6000 Series



EM 3000 Series



ETHERNET
CONVERTOR



RS 485-
RS232
CONVERTOR

EBS Benefits

- Automated billing
- Alarms for any abnormalities
- Predictive Maintenance schedule of equipments based on run hours
- Availability of manpower for any emergency.
- Manpower reduction
- Daily energy balancing

EBS Benefits – contd.

- More accurate billing and root cause analysis for high energy cost.
- Analysis of energy consumption, cost and energy cost trends
- Data analysis and solutions by an expert feasible
- Equipment efficiency analysis to make replacement strategies for investments
- Reduction in luminaire inventory, replacement cost and energy consumption in lighting
- Can keep check on spillages or wastages in premises and common areas
- Independent check on the equipment energy efficiency

SHOP READING LM - 24 - 1



FEEDER DETAILS	METER READING	M.F.	kWhr
PVR CHILLER 9TH FLR	397507.00	1.00	397501.00
SPARE1	397507.00	1.00	397488.00
SPARE2	397497.00	1.00	397488.00
EXALATOR PANEL	399621.00	1.00	397249.00
LIGHTING PANEL	452084.00	1.00	397311.00
BIG BAZAR AC-1	312582.00	1.00	296140.00
DG AUX PANEL	397773.00	1.00	397378.00
BIG BAZAR AC2	429525.00	1.00	396763.00
PROZONE 3RD FLR	575671.00	1.00	575658.00
OUTER SIGN PANEL	576261.00	1.00	575469.00
SEC URITY PANEL	576259.00	1.00	575663.00
SPARE3	8664.00	1.00	4.00

FEEDER DETAILS	METER READING	M.F.	kWhr
STP PANEL	7201.00	1.00	5.00
SPARE4	6.00	1.00	6.00
PANTHALOON GRD	61303.00	1.00	7.00
FLUSHING PANEL	30.00	1.00	8.00
SPARE5	21.00	1.00	9.00
FOURTH-FLR-PANEL	27.00	1.00	10.00
SPARE6	33.00	1.00	11.00
2ND FLR PANEL	42079.00	1.00	12.00
3RD FLR PANEL	38293.00	1.00	13.00
WATER SYS PANEL	13669.00	1.00	14.00
SPARE7	30.00	1.00	16.00
BIG BAZAR LIGHT1	100443.00	1.00	17.00

OP READING LM24 - 1

SHOP READING LM24 - 2



SHOP READING LM24 - 8

COMM STATUS

HISTORY

OP READING LM24 - 3

SHOP READING LM24 - 4

MIMIC

USER MANUAL

HOME PAGE

OP READING LM24 - 5

SHOP READING LM24 - 6

SHOP READING LM24 - 7

REPORTS

LOG ON

EXIT eLAN



ALARM CURRENT STATUS 2

PREV NEXT

NODE	TYPE	VALUE	LOW	HIGH	STATUS	LAST OCCURED AT	NODE	TYPE	VALUE	LOW	HIGH	STATUS	LAST OCCURED AT
CHILLER NO 3	KVA	498	530	550	<input type="checkbox"/>		CHILLER NO 4	KVA	0	334	45	<input type="checkbox"/>	
	KW	414	500	550	<input type="checkbox"/>			KW	0	44	445	<input type="checkbox"/>	
	A	701	34	33	<input type="checkbox"/>			A	0	33	334	<input type="checkbox"/>	
	PF	0.83	0.80	0.90	<input type="checkbox"/>	25/05/2004 21:06:00		PF	0.00	-0.90	-0.70	<input type="checkbox"/>	
	VLL	410	55	66	<input type="checkbox"/>			VLL	421	55	55	<input type="checkbox"/>	
	VLN	237	66	55	<input type="checkbox"/>			VLN	243	5	5	<input type="checkbox"/>	
CHILLER NO 8A	KVA	0	343	45	<input type="checkbox"/>		OW TRF'MEP NO 2 ELEC A	KVA	29	35	33	<input type="checkbox"/>	
	KW	0	45	34	<input type="checkbox"/>			KW	25	33	455	<input type="checkbox"/>	
	A	0	30	343	<input type="checkbox"/>			A	40	33	22	<input type="checkbox"/>	
	PF	0.00	0.40	0.50	<input type="checkbox"/>			PF	0.86	-0.10	0.09	<input checked="" type="checkbox"/>	25/05/2004 20:02:12
	VLL	420	79	77	<input type="checkbox"/>			VLL	425	78	8	<input type="checkbox"/>	
	VLN	243	77	77	<input type="checkbox"/>			VLN	246	8	9	<input type="checkbox"/>	
BEACH RESORT CLUB (WED)	KVA	0	34	45	<input type="checkbox"/>		BEACH CHILLER NO 1	KVA	143	455	33	<input type="checkbox"/>	
	KW	0	34	45	<input type="checkbox"/>			KW	101	33	34	<input type="checkbox"/>	
	A	0	30	55	<input type="checkbox"/>			A	198	22	44	<input type="checkbox"/>	
	PF	0.00	0.20	2.34	<input type="checkbox"/>			PF	0.70	0.09	1.00	<input type="checkbox"/>	
	VLL	0	90	88	<input type="checkbox"/>			VLL	418	80	80	<input type="checkbox"/>	
	VLN	0	99	88	<input type="checkbox"/>			VLN	242	77	89	<input type="checkbox"/>	

MAIN	MATRIX	HISTORY	VIEW REPORTS	HELP	Explorer <input type="button" value="OPEN"/>
METER DATA	SLD	ALARMS SET	NODE STATUS	LOGIN	Modbus <input type="button" value="OPEN"/>
REAL TREND	CREATE REPORTS	UTILITIES	ALARM VIEW <input checked="" type="radio"/>	CLOSE	Excel <input type="button" value="CLOSE"/>

Max Min Report of VLL, Amps, KW & PF - Hourly wise with Time of Occurrence

Date: 20/02/2006

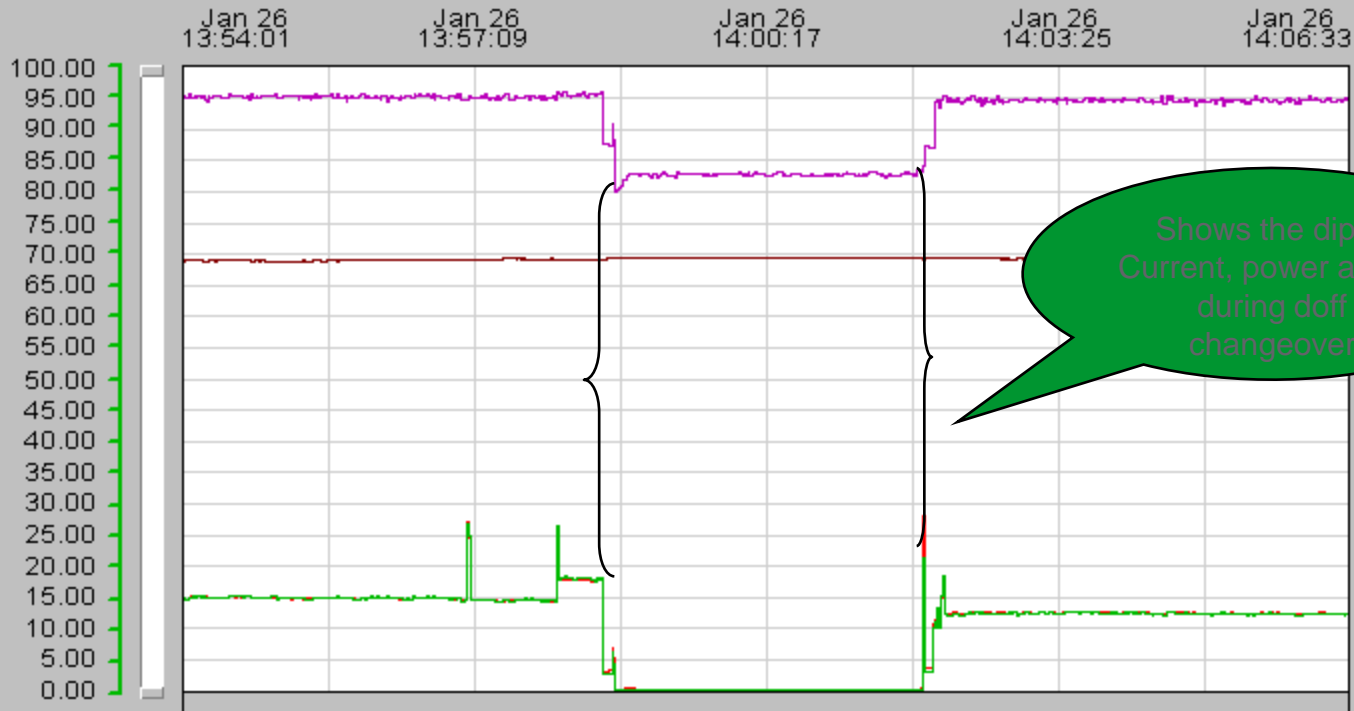
Feeder name		Pump No.1	Pump No.2	Pump No.3	Pump No.4	Pump No.5	Pump No.6	Pump No.7	Pump No.8	F.S 1	F.S 2	F.S 3	F.S 4
Voltage - LL	max	0	3395.537	3394.768	3394.939	3405.845	3405.842	3408.068	3407.827	3369.749	3373.4	3371.475	3374.1
	Min	00:05:00	01:00:00	01:00:00	01:00:00	01:00:00	01:00:00	01:00:00	01:00:00	00:55:00	00:55:00	00:55:00	00:55:00
CURRENT	Max	0	3338.001	3337.357	3337.057	3348.387	3348.024	3350.132	3350.277	3328.445	3331.23	3329.537	3332.6
	Min	01:00:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00
KW	Max	0	143.0988	150.565	2.5E-17	2.5E-17	5E-17	164.6573	194.6063	193.7987	194.0418	206.2328	194.1
	Min	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00
PF - lag	Max	0	133.3767	144.3189	2.5E-17	2.5E-17	5E-17	155.5608	182.9423	184.141	184.0738	195.9671	184.1
	Min	01:00:00	00:55:00	00:30:00	00:05:00	00:05:00	00:05:00	00:45:00	00:40:00	00:55:00	00:55:00	00:55:00	00:55:00
Voltage - LL	Max	0	813.3397	869.3724	7.5E-19	7.5E-19	1.5E-18	949.2838	1115.041	1089.223	1104.452	1172.426	1098.3
	Min	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00	00:05:00
PF - lag	Max	0	767.8888	834.5871	7.5E-19	7.5E-19	1.5E-18	903.6476	1060.774	1050.255	1063.476	1126.177	1053.0
	Min	01:00:00	00:55:00	00:30:00	00:05:00	00:05:00	00:05:00	00:40:00	00:30:00	00:55:00	00:55:00	00:55:00	00:55:00
Voltage - LL	Max	0.000	0.985	0.998	0.000	0.000	0.000	0.993	0.988	0.976	0.988	0.987	0.9
	Min	00:05:00	00:35:00	00:05:00	00:05:00	00:05:00	00:05:00	01:00:00	00:40:00	00:55:00	00:55:00	00:50:00	00:05:00
CURRENT	Max	0.000	0.981	0.990	0.000	0.000	0.000	0.988	0.983	0.971	0.983	0.983	0.9
	Min	01:00:00	00:25:00	01:00:00	00:05:00	00:05:00	00:05:00	00:25:00	00:25:00	00:25:00	00:25:00	00:10:00	00:40:00
Voltage - LL	Max	0	3405.15	3404.874	3404.484	3415.488	3415.43	3417.158	3417.324	3351.626	3354.689	3352.8	3356.1
	Min	01:05:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00	01:15:00
CURRENT	Max	0	3390.626	3390.027	3390.109	3405.057	3337.083	3340.632	3338.448	3341.6	3341.6	3341.6	3341.6
	Min	02:00:00	01:35:00	01:45:00	01:05:00	01:05:00	01:05:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00
KW	Max	0	129.7282	142.931	2.5E-17	2.5E-17	5E-17	153.7565	179.9583	184.4271	184.2615	196.5299	184.8
	Min	02:00:00	01:35:00	01:45:00	01:05:00	01:05:00	01:05:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00
PF - lag	Max	0	805.6874	874.2569	7.5E-19	7.5E-19	1.5E-18	955.9848	1111.471	1097.157	1109.255	1174.444	1100.3
	Min	01:05:00	02:00:00	02:00:00	01:05:00	01:05:00	01:05:00	02:00:00	02:00:00	02:00:00	02:00:00	02:00:00	02:00:00
Voltage - LL	Max	0	751.9826	838.2083	7.5E-19	7.5E-19	1.5E-18	901.5816	1050.087	1039.471	1054.926	1123.259	1050.1
	Min	02:00:00	01:35:00	01:10:00	01:05:00	01:05:00	01:05:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00	01:35:00
PF - lag	Max	0.0000	0.9869	0.9974	0.0000	0.0000	0.0000	0.9946	0.9895	0.9760	0.9887	0.9858	0.9
	Min	01:05:00	01:10:00	01:35:00	01:05:00	01:05:00	01:05:00	01:15:00	01:05:00	01:10:00	01:50:00	01:25:00	01:10:00

MAX & MIN OF VITAL PARAMETERS WITH DATE AND TIME OF OCCURENCE - PER HOUR BASIS

HISTORICAL TREND

MAX VALUE 26.8

MIN VALUE 0.2



Ring Frame 1 - Avg PF	0.91	0.90
Ring Frame 1 - Avg I	22.20	18.50
Ring Frame 1 - Avg VLL	414.70	415.90
Power of Ring Frame 1	14.86	12.34

13:54:01 14:06:33

13:54:01 14:06:33 12m 32s

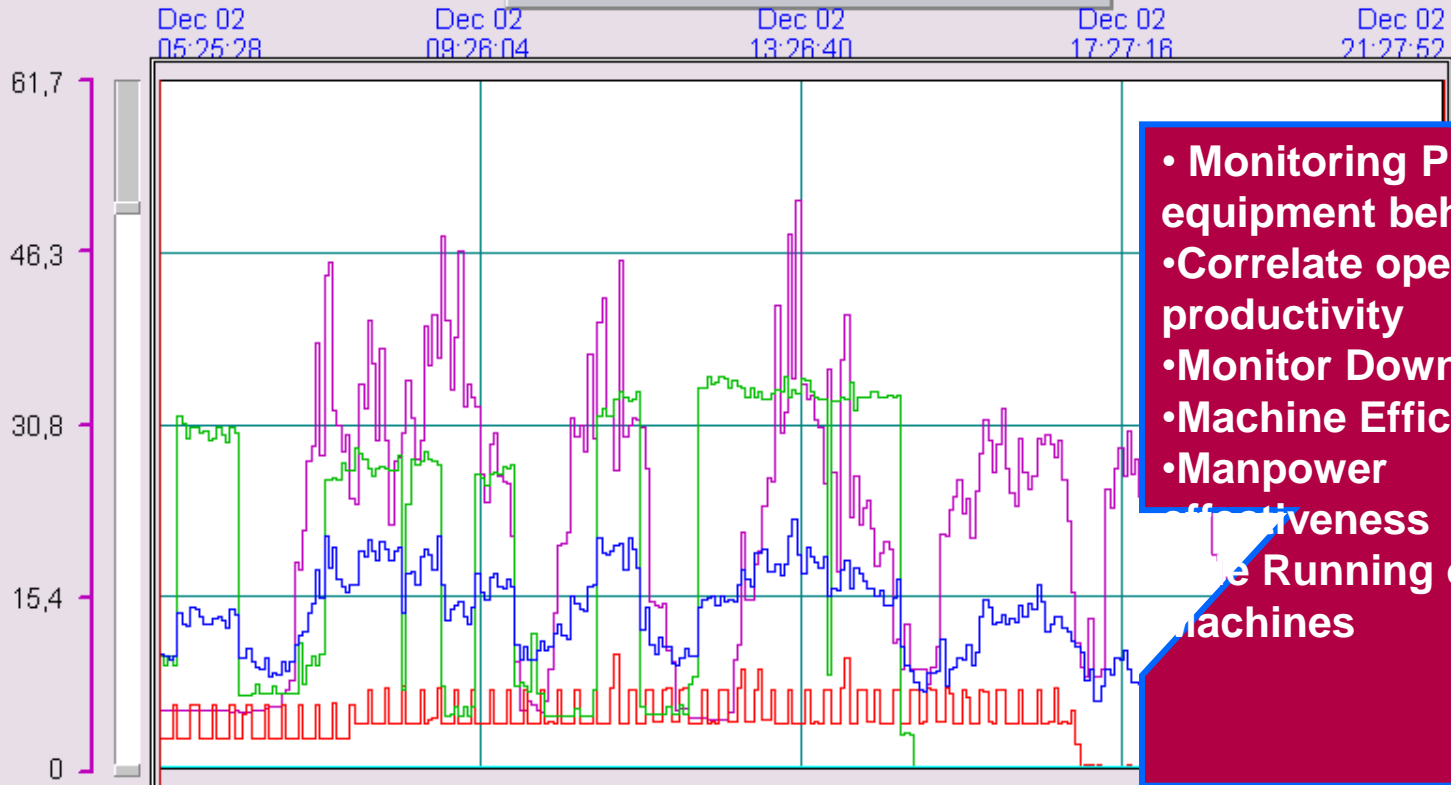
4 hours 1 hour 4 minutes 30 minutes 10 minutes

- Doffing changeover duration – keep minimum to increase productivity
- To benchmark the ideal cycle time

7. Historical Screen

Historical Trend

M8-Slitter, K4 KT_A



- Monitoring Production equipment behavior
- Correlate operation Vs productivity
- Monitor Downtime
- Machine Efficiency
- Manpower effectiveness
- The Running of machines

05:25:28 21:27:52

Zoom In 16h 2m 24s Zoom Out

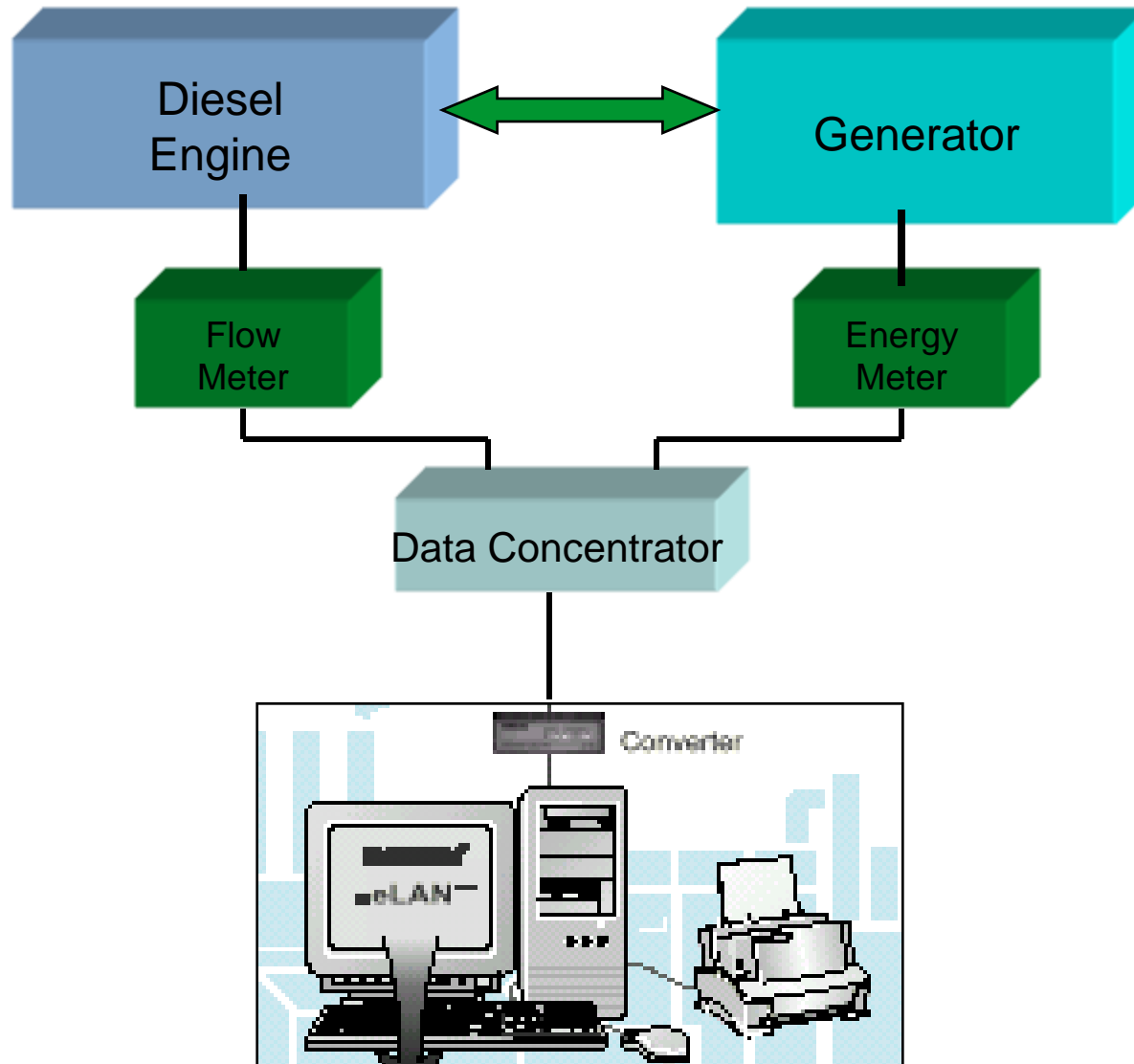
4 hours 1 hour 1 minutes 30 minutes 10 minutes

Max Value
512.0

Min Value
42.9

M8-Slitter, K4 KT_A 50.85 — 59.89	M11-U45, kk_A 100.21 — 0.74	M14-U90, KK_KW 0.00 — 0.00
M12-U65, KK_A 26.42 — 0.00	M1-Transformer T-1_KW 273.28 — 107.50	

Generator Optimisation



Generator Optimisation

- On line data of diesel consumed and units generated.
- Any deterioration in efficiency will be immediately seen.
- Average should be 3.5 units per liter or better.
- Generator can be efficiently operated and maintained

Lighting

Best Operating Practices in Lighting

Upgrade Lighting technologies

Daylight harvesting

Energy management in lighting controls

Occupancy sensors

Optimizing Voltage in lighting circuit

Types of Lighting

- Fluorescent lamps (FTL)
- Compact Fluorescent Lamps (CFL)
- Mercury Vapour Lamps
- Sodium Vapour Lamps
- Metal Halide Lamps

Luminous Performance

Characteristics of Commonly Used Luminaries

Type of Lamp	Lum / Watt		Color Rendering Index	Typical Application	Life (Hours)
	Range	Avg.			
Incandescent	8-18	14	Excellent	Homes, restaurants, general lighting, emergency lighting	1000
Fluorescent Lamps	46-60	50	Good w.r.t. coating	Offices, shops, hospitals, homes	5000
Compact fluorescent lamps (CFL)	40-70	60	Very good	Hotels, shops, homes, offices	8000-10000
High pressure mercury (HPMV)	44-57	50	Fair	General lighting in factories, garages, car parking, flood lighting	5000
Halogen lamps	18-24	20	Excellent	Display, flood lighting, stadium exhibition grounds, construction areas	2000-4000
High pressure sodium (HPSV) SON	67-121	90	Fair	General lighting in factories, ware houses, street lighting	6000-12000
Low pressure sodium (LPSV) SOX	101-175	150	Poor	Roadways, tunnels, canals, street lighting	6000-12000

Lighting Energy Saver Features

% Savings, One Time Setting

20% Tech parks
OLTC / UPS Stabilized Supply
PFC Ballasts, New Lamps

15% General Use
Malls, Offices, Multiplexes, Auditoriums
OLTC Stabilized
Mixed Old / New Lamps

10% Buildings older than 5 yrs
Supply goes down to 200v occasionally
Very Old Fluorescents

Bypass - Supply < 200v

Savings Spot Check

Factory Option Meter

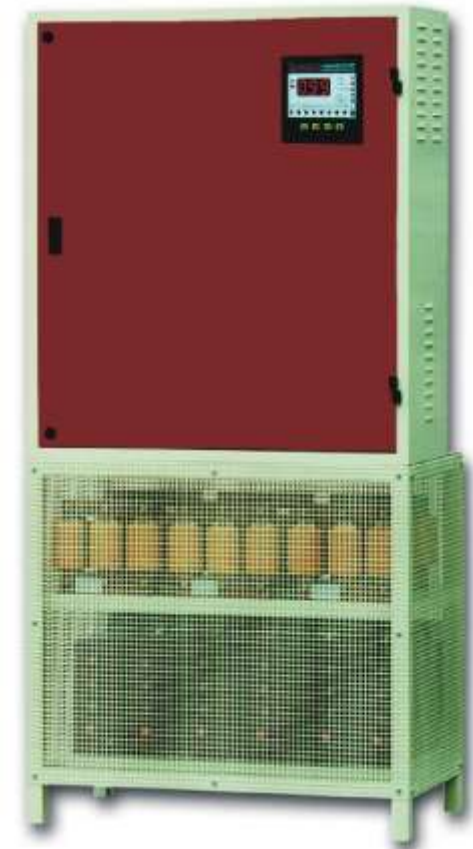
Short circuit,
Over load protection

Electronic Line Monitor
Lo, OK, Hi voltage and Trip
with Alarm Relay o/p



Power Factor Improvement Panel

- Compact modular stand alone unit
- Comprises of capacitors, Contactors, isolating switch, HRC fuses, Power factor Controller
- Models from 35kVAr to 200kVAr



Demand Controller

- TOU Demand Control
- User Programmable Upper Limit, Lower Limit,
- Essential Load and Prediction Interval for sophisticated Demand Control
- Demand Control through Unique Predictive technique and Sliding Window Integration Leads to :
Reduced Energy Losses, Improved Load Factor &
- Minimal disruption in operations
- 3 Change Over Potential free control outputs for:
Predicted Demand exceeding Target, Demand exceeds Target & Restore Load



Air-conditioning

Air-conditioning

The cooling effect produced is quantified as tons of refrigeration.

1 ton of refrigeration = 3024 kCal/hr heat rejected.

Energy Use Standards

● The available norms of energy use in hotel industry are follows:-

- Power - 60 – 75 kWh/day/room
- Fuel - 4 – 5 Liters/day/room
- Water - 1.15 – 1.3 KL/day/room

BEE has recently announced the Building Codes.

Types of Compressors

- Centrifugal compressors
- Reciprocating compressors
- Screw Compressors
- Vapour absorption chillers

Effect of Poor Maintenance on Compressor Power Consumption

Condition	Evap Temp (°C)	Cond Temp (°C)	Refrigeration Capacity (tons)	Specific Power Consumption (kW/ton)	Increase in kW/ton (%)
Normal	72	405	170	069	-
Dirty condenser	72	461	156	084	204
Dirty evaporator	17	405	138	082	183
Dirty condenser and evaporator	17	461	127	096	387

Energy Performance – Down Side Equipments

● Chilled Water Pump	-	0.10	–	0.12	kW/TR
● Condenser Water	-	0.085	–	0.12	kW/TR
● Cooling Tower	-	0.03	–	0.1	kW/TR
● AHU	-	3000	–	6000	CFM/kW
● FCU	-	8000	-	10000	CFM/kW

ENERGY SAVINGS OPPORTUNITIES

- ***Cold Insulation***

- **Thumb rules for cold Insulation**

- Chilled water pipe insulation (Provide 2 to 3 inch thickness)
- Duct insulation (Provide 1 to 2 inch thickness)
- Suction line refrigerant pipe insulation (Provide 2 to 3 inch thickness)

- ***Building Envelop***

- ***Building Heat Loads***

- ***Process Heat Loads Minimization***

- Flow optimization and Heat transfer area increase to accept higher temperature coolant
- Avoiding wastages like heat gains, loss of chilled water, idle flows
- Frequent cleaning / de-scaling of all heat exchangers

Energy Saving Opportunities

- Comfort conditions: 25°C, 55 % RH
- Minimize heat load through glass windows
 - Provide sun control film, Use double glass
- Insulate roof top in A/C Building
 - Provide under deck insulation of 50 mm, Provide lawns at roof top
- Optimize fresh air supply into a/c room
 - Conduct CO₂ study to optimize fresh air quantity
 - 10-15 cfm/person or 0.25 cfm/sq..ft as per ASHRAE
- Minimise artificial lighting
 - Use natural lighting , 3.5 kw lighting consumes 1.0 TR load
- Provide controls
 - install thermostat to control peak and base load
 - Provide VSD for AHU with return air temp.sensor-set at 25°C
- Air tight the building envelop
 - prevent cold air leakage, Provide door closures
- Avoid heat producing equipments inside the room
 - keep away UPS Battery , ovens, other loads

Solutions for Efficiency in Air Conditioning

- Energy Audit can indicate where efficiency is low or where energy consumption is excessive. It will also assess losses and wastages in the system.
- EMS can provide running efficiency of the system by monitoring energy efficiency of chillers and other components on a continuous basis.
- BMS can control HVAC to provide maximum efficiency without compromising comfort conditions

Case Studies

PF in a Building
Energy Billing in Software Park

Office Building

- A large office building
- Two transformers and two LT panels
- APFC relays installed with both panels
- Still average monthly power factor was as low as 0.79
- Heavy LPF penalty of as high as Rs 2.4 lakhs per month

Office Building

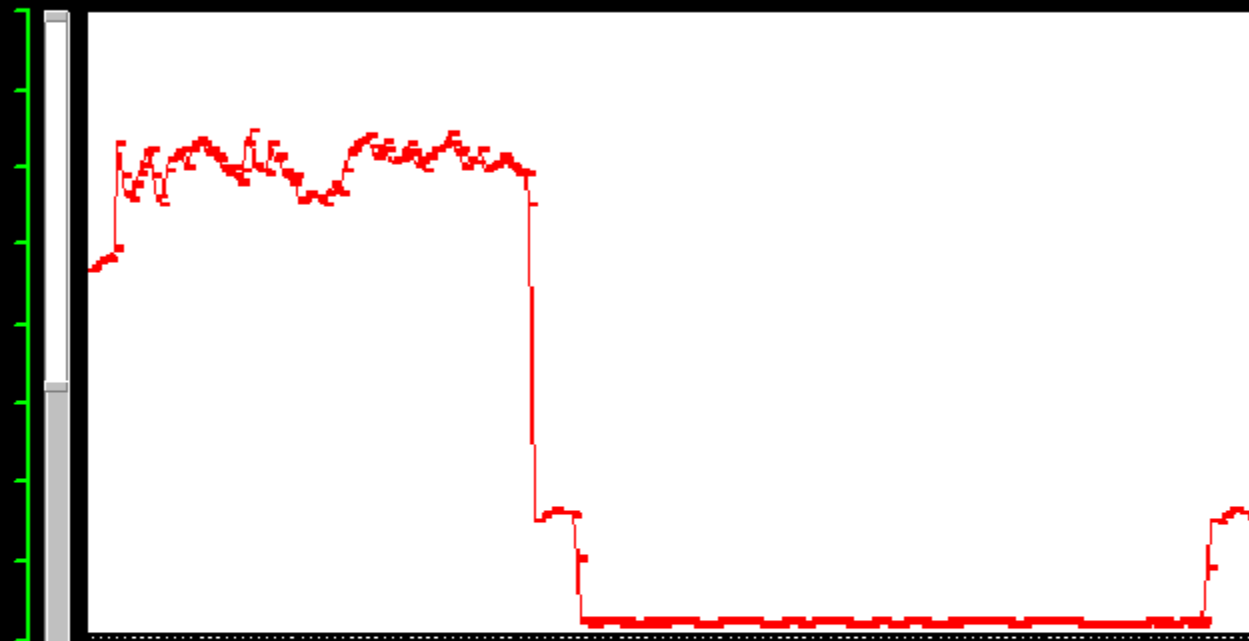
- Examined performance of all capacitors, replaced damaged ones
- Added more capacitors in the circuit
- The relays were checked suspecting malfunctioning
- Approached the EB suspecting fault in the electronic meter

Office Building

- The overall power factor remained at about 0.8 after all these efforts
- Finally, the department decided to equip the building with eLAN and called in Konzerv

HISTORICAL TRENDS

May 15 09:00:00 May 15 15:00:00 May 15 21:00:00 May 16 03:00:00 May 16 09:00:00



09:00:00 [play] [stop] [rewind] [fast forward]

[rewind] [fast forward] 09:00:00 [play] [stop]

[rewind] 09:00:00 [play] [Zoom In] 1d [Zoom Out] 09:00:00 [play]

4 hours 1 hour [rewind] [rewind] Minutes [play] [fast forward] 30 minutes 10 minutes [fast forward]

ZOOM

Help

Mimics

Real Time Trends

Historical Trends

Alarms

Reports

Print

Office Building

- The load pattern as recorded by eLAN indicated kW loading as low as 15 kW after office hours, about 14 hours per day
- Same load pattern during Saturdays, Sundays and Holidays
- Decided to check the PF profile

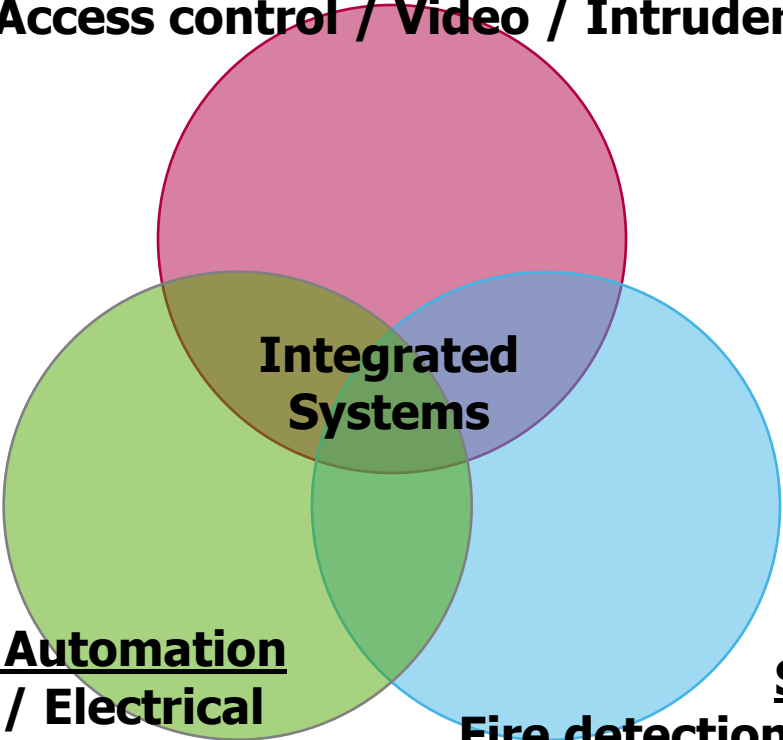
Office Building

- The installed capacitors were all 25 kVAR rating each
- Due to low load none of the capacitors were getting switched on
- Replaced the capacitors with lower rating of 10 kVAR each
- Relays started switching on capacitors
- Power factor improved to above 0.95
- Resulted in annual saving of Rs. 28.8 lakhs per annum

Building Management Systems

Our Domain

Security
(Access control / Video / Intruder)



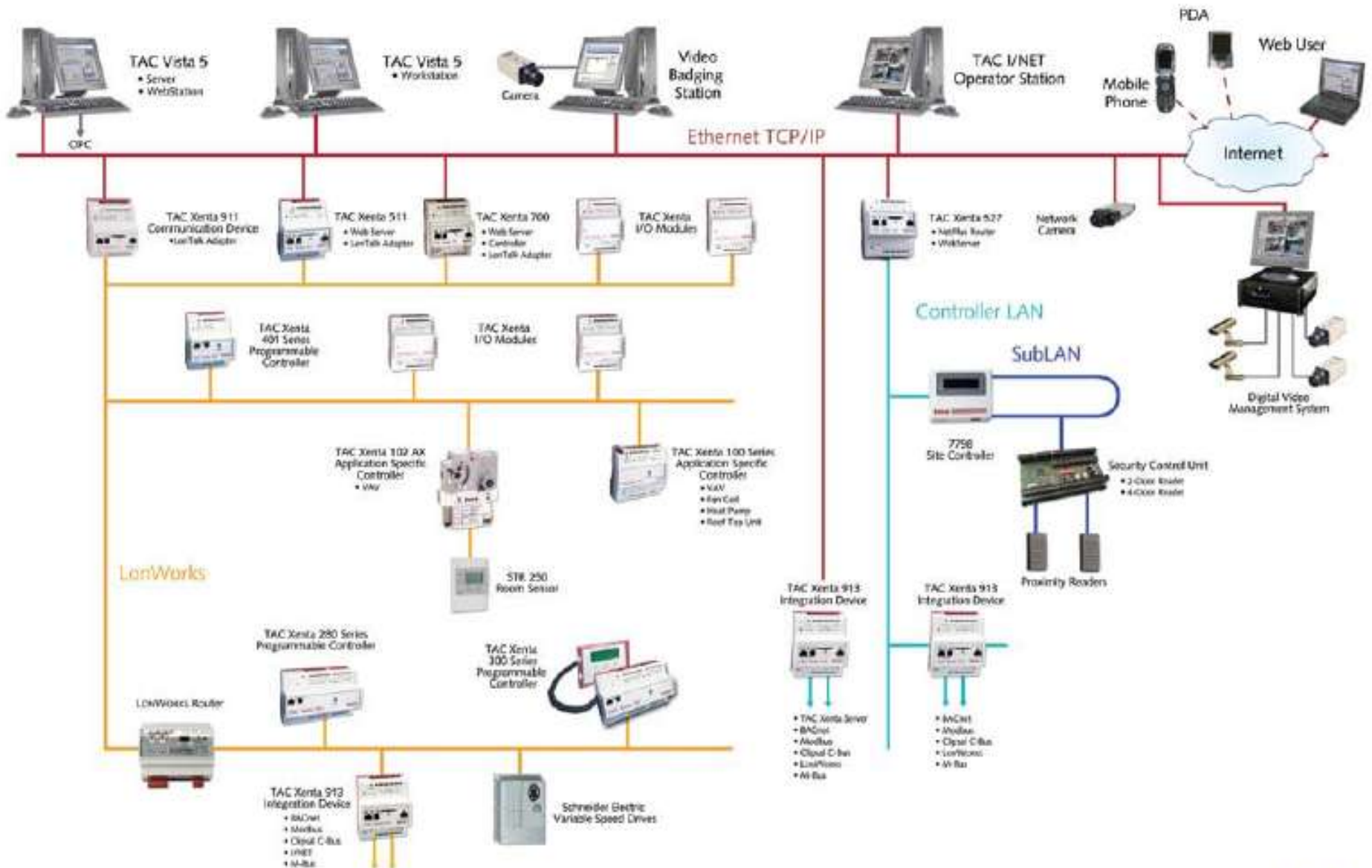
Building Services Automation
HVAC / Lighting / Electrical
Water

Safety
Fire detection / Gas Suppression

Advantages of an Integrated System

- Reduced Opex. and Capex.
- Coordinated Services
- Better Disaster Management
- Improved MIS for the Facility Manager
- Energy Monitoring and Mapping the Energy profile of the Facility
- Integration with Third Party Systems viz. Chillers , DG PLC , PACs, Energy Meters via Open Protocols.
- Personalised Environment Management and Energy Saving Strategies.

Integrated TAC Vista™ Architecture



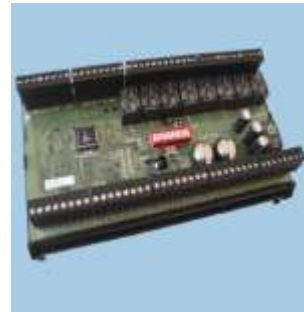
BMS

- TAC Vista front end
- Open Protocol- LONWORKS.
- 32 bit DDC Controllers with RTC on board.
- Range of freely programmable and Application Specific Controllers.
- Controllers capable of working in Standalone mode. Peer to Peer communication.
- Range of Valves , Sensors and field devices from TAC.
- Integration with Third Party equipments viz. Chillers , DG , PACs , UPS etc
- OPC / Web Monitoring.
- Simple to use and Powerful graphics – Reduced Training time and Costs



Access Control

- Seamless Integration with TAC Vista.
- Networkable/ IP/ POE Controllers.
- 2 Door/ 4 Door/ 8 Door Configuration.
- Standalone with RTC on board.
- Wiegand/Proximity/Smart Card/ Biometrics.
- High Level Encryption for data transfer.
- Web Monitoring.
- Modular and Expandable.
- Multi-Tenant.
- Elevator Control /Lighting Controls.
- Visitor Management
- Intruder Alarm.
- DVMS Integration.



Video Surveillance

- Pelco and Integral.
- Pelco widely recognised in Refineries, Oil and Power sector & Process Industries.
- Integration with TAC Vista / TAC I/NET
- Range of Analogue and Digital High Resolution cameras.
- Range of Analogue DVRs / Hybrid DVRs.
- System expandable from a few cameras to unlimited cameras
- Unlimited Network recording for IP Solutions.
- Video Analytics.



FX- analytical addressable fire detection panel

- flexible modular construction
- big 320 x 240 pixel LCD display
- all configurations done with Fx- configuration SW
- all inputs / outputs are configurable
- access level codes set with conf.-SW
- Several helpful functions for commissioning.
- SW- update with PC.
- all languages and features on the same SW
- powerful power supply & loops

