

ENERGY MANAGEMENT SOLUTIONS

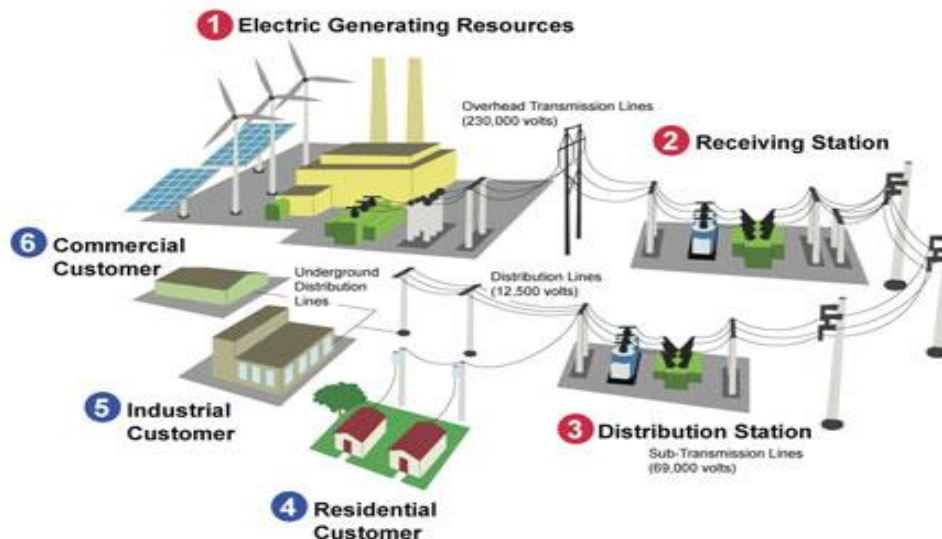
Products, Solutions & Technology

By

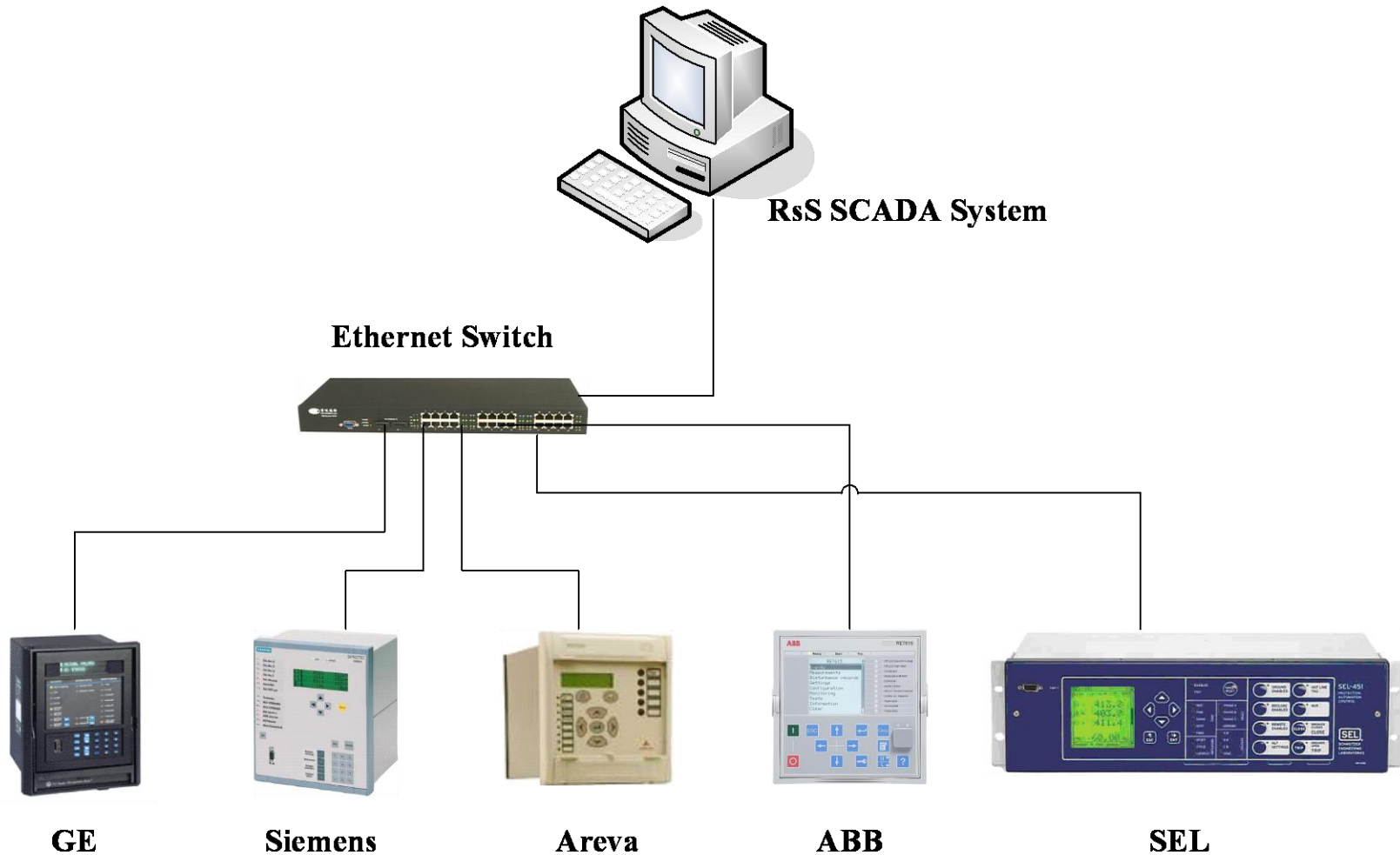
RBH Solutions Private Limited

RBH Introduction

- Provides solutions for SMART Communication / Interfaces and Automation Solutions
- Holds one the largest IPs in India for Communication Middleware used in automation industry
- 5 Indigenously developed different products to cover all End to End Requirements
- Example Smart Grid(1 – 6: Generation to Consumption)

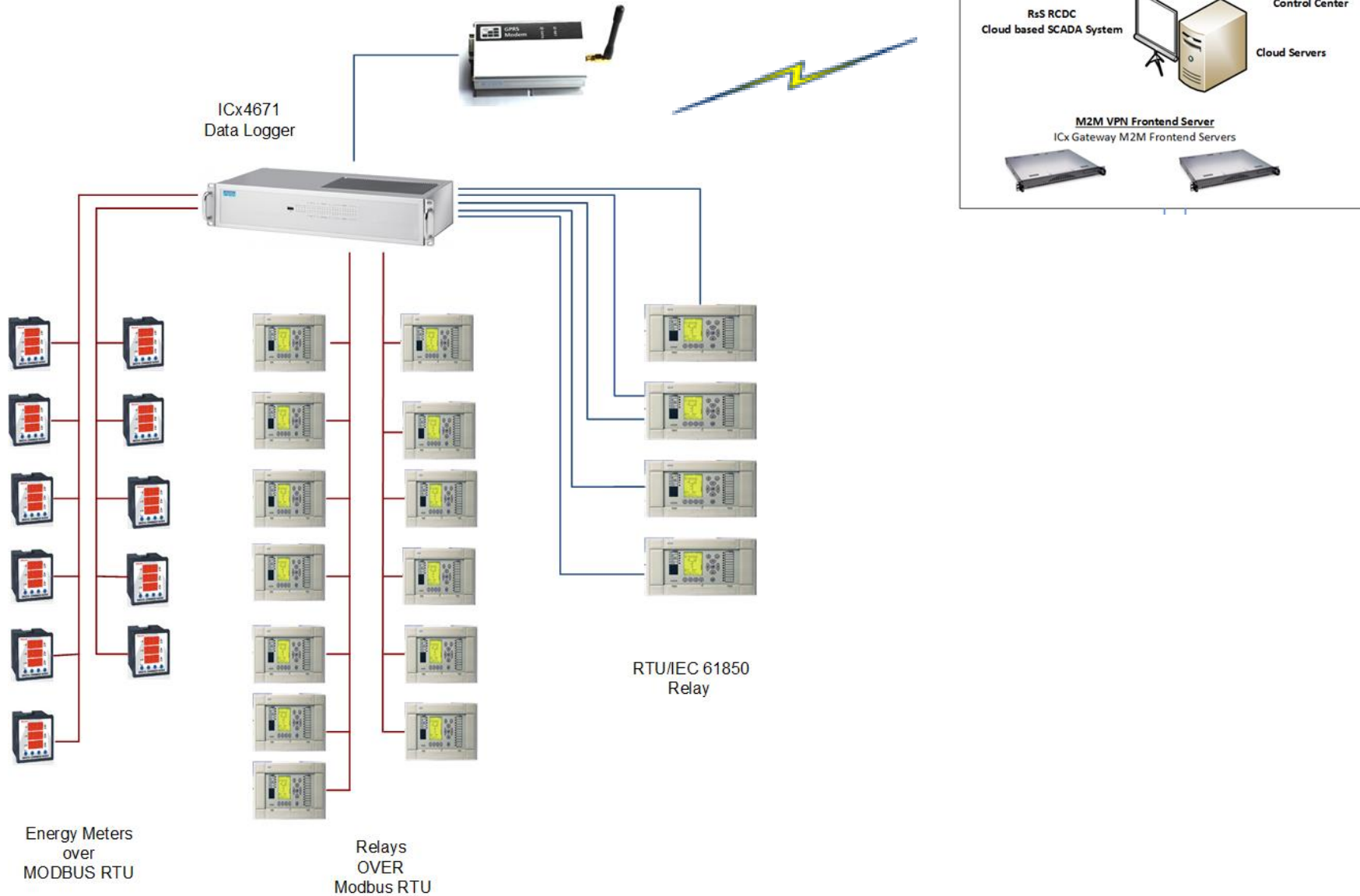


RBH Products: Vendor Independent

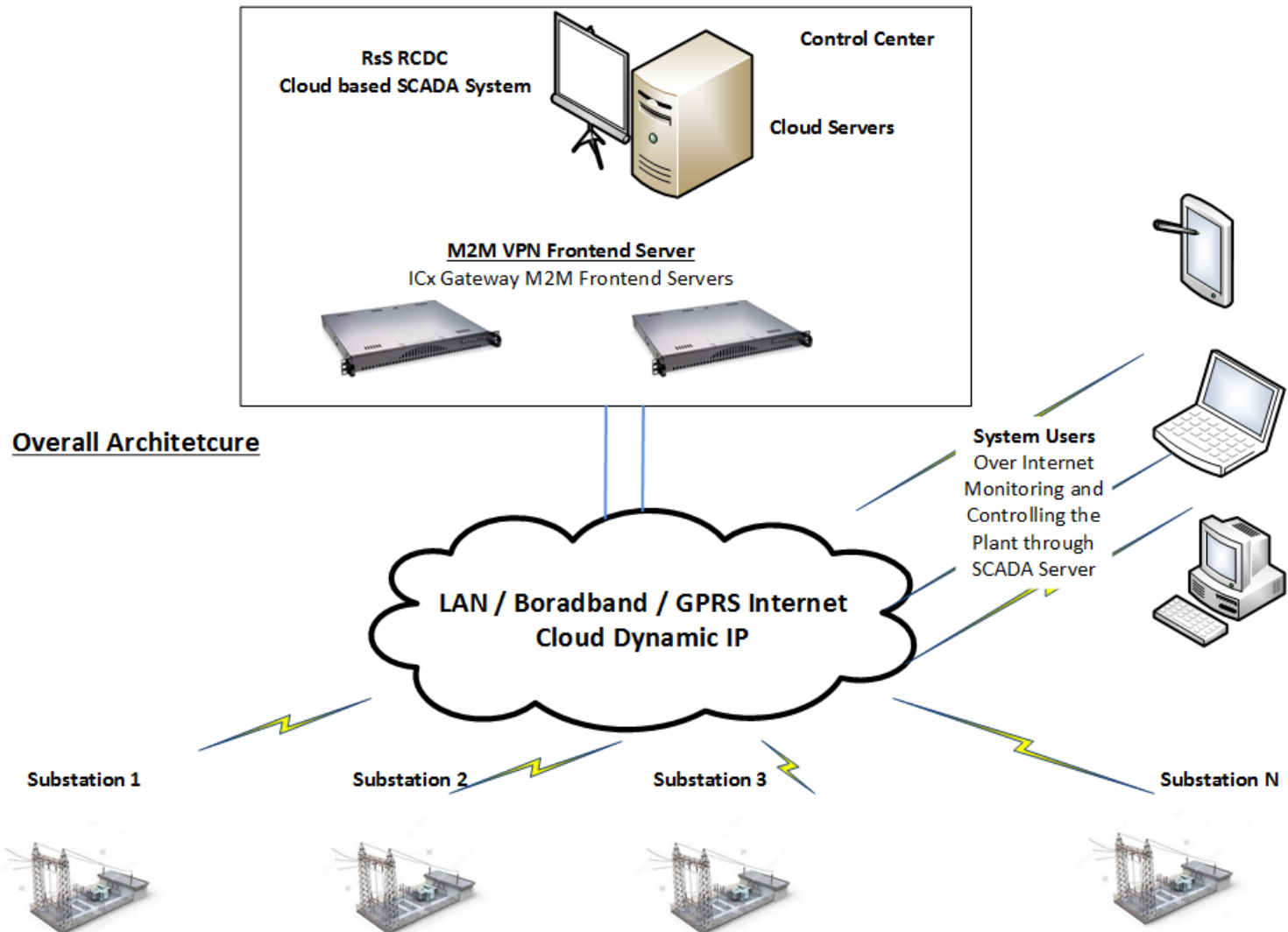


ALL IEDs / BCUs over IEC 61850 Protocol

Substation Monitoring: New and Existing Substations

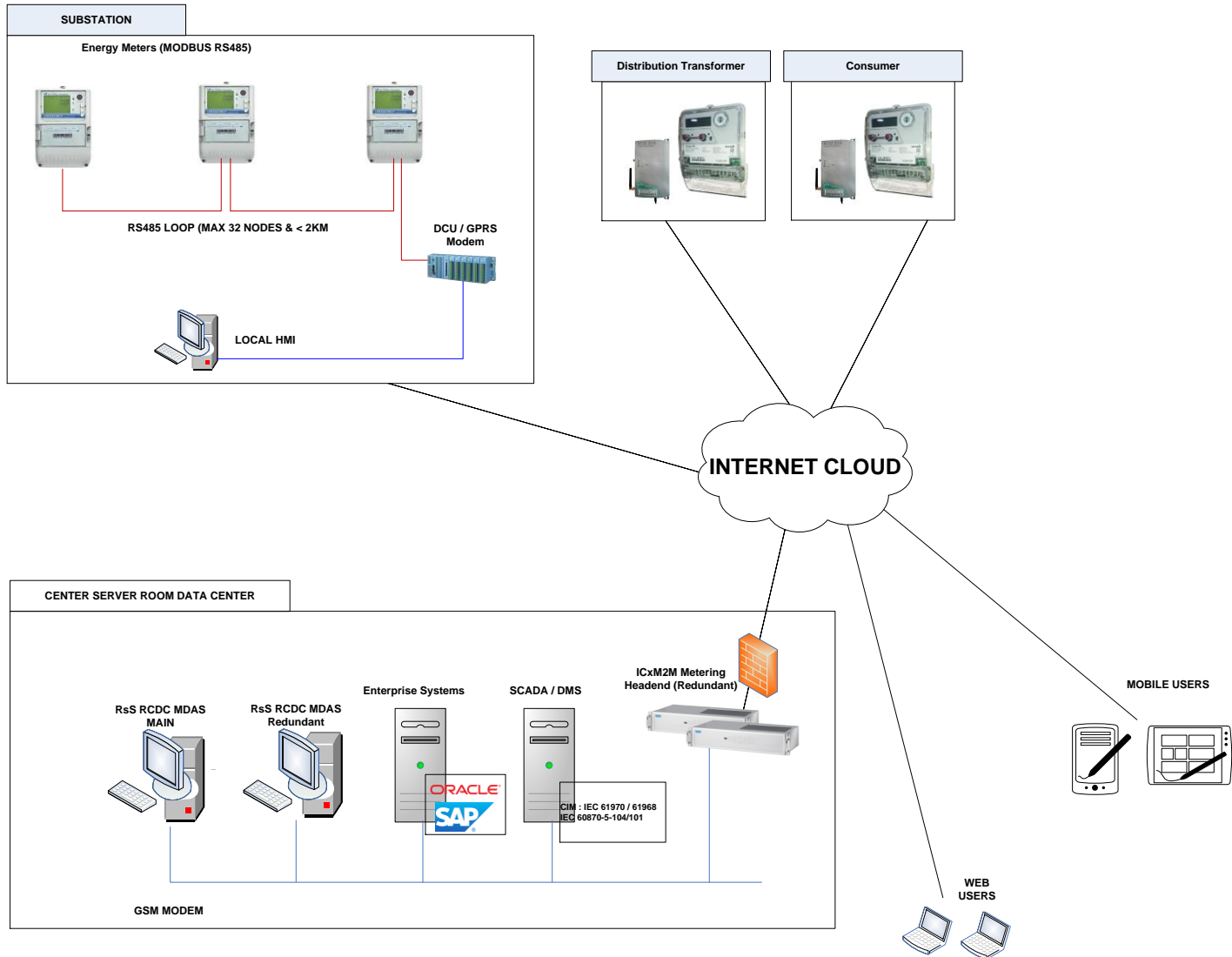


Central Monitoring System: Substation

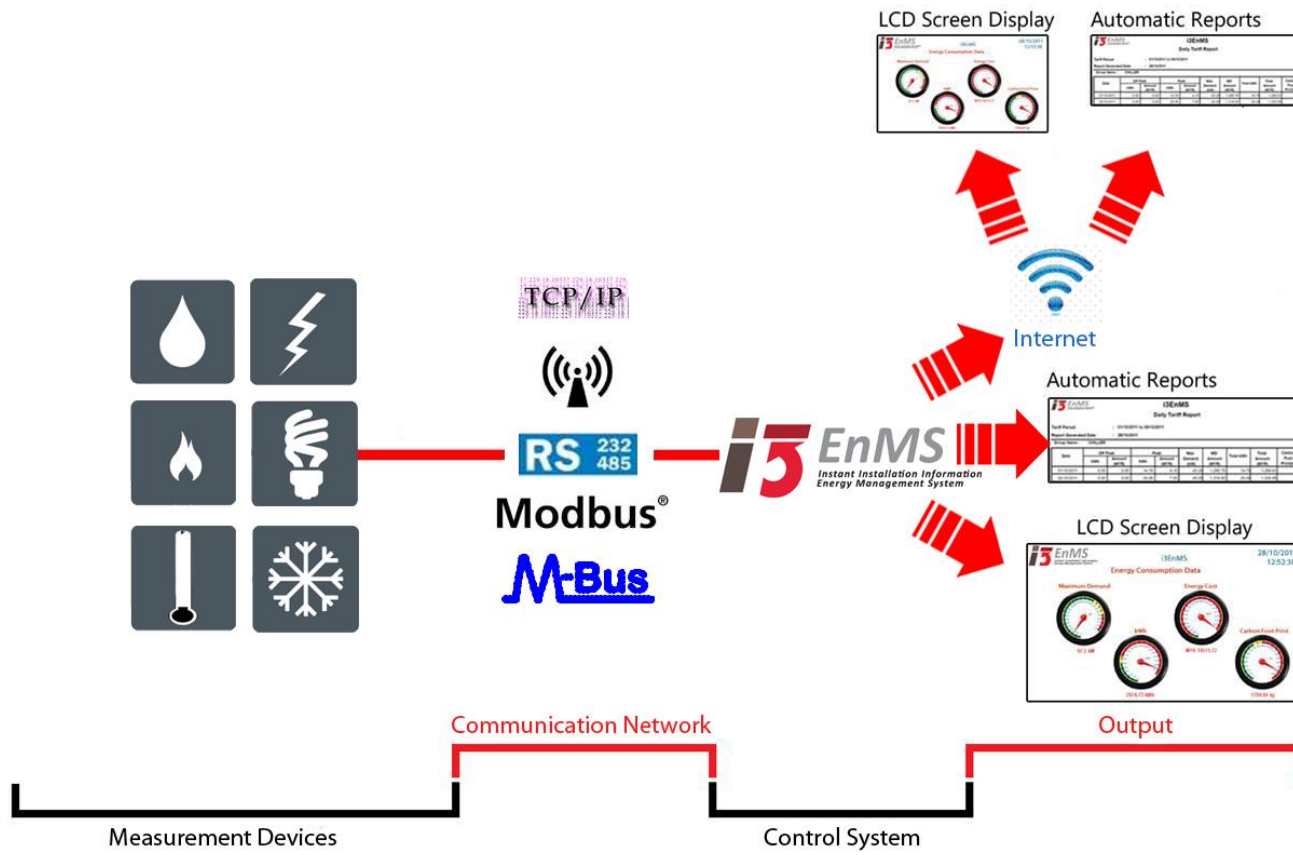


MDM: Architecture

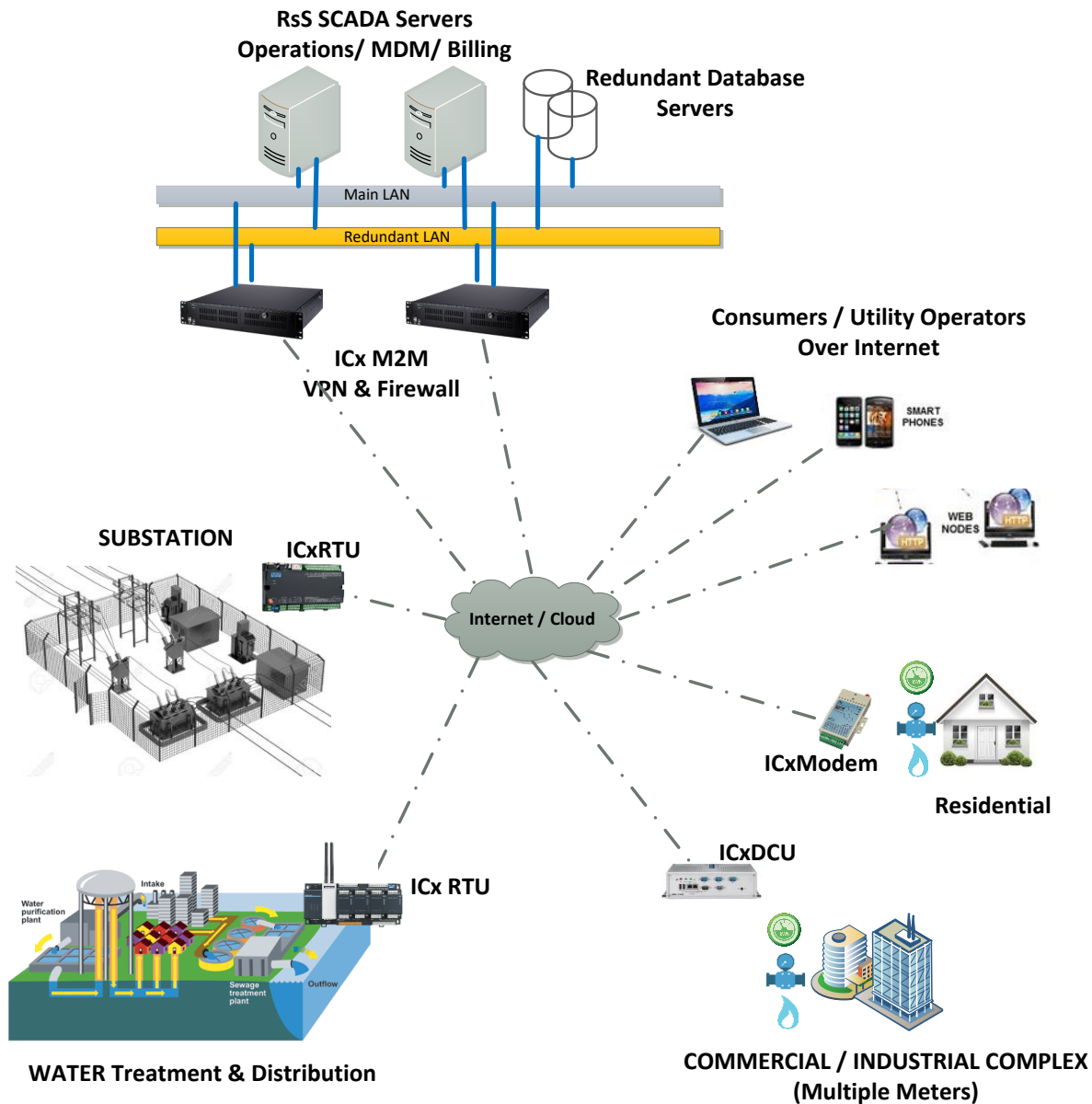
SYSTEM ARCHITECTURE



Energy Management System



Central Monitoring System: All in One



Sample WEB Views

Wattmon Online Portal

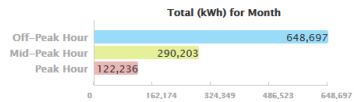
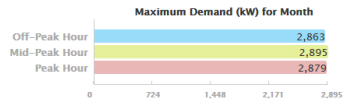
my.wattmon.com/satunpyro/view2/month/Z10/2016-04

Dashboard Reporting

Tariff Comparison for AIMS

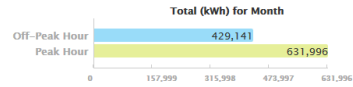
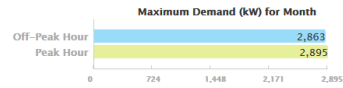
April 2016 Day View Month View Download

ETOU Tariff Usage

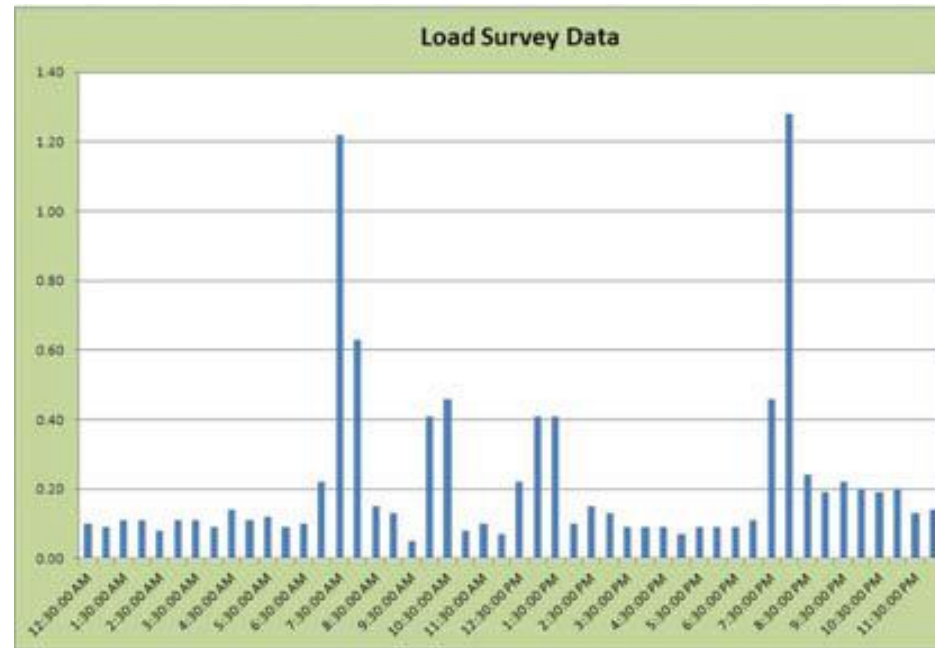


Tariff	C2
MD Rate (RM)	42.6
kWh Rate (RM)	Off-Peak Hour: 0.224 Mid-Peak Hour: 0.339 Peak Hour: 0.636
Total kWh	1,061,137.70

TOU Tariff Usage



Tariff	C2
MD Rate (RM)	45.1
kWh Rate (RM)	Off-Peak Hour: 0.224 Peak Hour: 0.365
Total kWh	1,061,137.70
MD Surcharge	130,564.50
kWh Total Charge	326,806.38



RBH SOLUTIONS Dashboard

Data Table Graph

Day Week Month Year

09/03/2015 to 09/04/2015

Energy Flow Power Efficiency Temperature Volume

Sample WEB Views

RBH Solutions

RSS RCDC

SLD ALARMS EVENTS TREND REPORT

Date Time	Circuit Name	DI/AI Name	Status	Category
9/28/2015 4:35:49 PM	<System>	FRTU_CALCUM_MODE_GTW	CONNECTED	---
9/28/2015 4:34:26 PM	<System>	FRTU_SEC_37_C_335_GTW	CONNECTED	---
9/28/2015 4:33:49 PM	<System>	BUILDER AREA_SS_GTW	DISCONNECTED	SYSTEM
9/28/2015 4:32:11 PM	<System>	FRTU_BETA-1. FRONT OF MOTHER DAIRY_GTW	DISCONNECTED	SYSTEM
9/28/2015 4:32:10 PM	BETA-2. OUT SIDE PKT F S/S	ISO-2	OPEN	OPERATIONAL

KALKHAR SLD

Energy Consumption Trend

BTS	Consumption (%)
BTS A1	15.05%
BTS A2	22.26%
BTS B5	12.96%
BTS B6	23.81%
BTS B9	23.81%

Energy Consumption Breakdown

BTS	Consumption (%)
BTS A1	15.05%
BTS A2	22.26%
BTS B5	12.96%
BTS B6	23.81%
BTS B9	23.81%

Renewing Our Future

GAJENDRAGADH

Gajendragadh -> A3

REAL VALUE	
POWER GENERATED :	10472915
POWER CONSUMED :	-25703
ACTIVE POWER :	387.2
REACTIVE POWER :	3764
TOTAL REACTIVE ENERGY :	-1134693
TOTAL Hrs :	83298
GRID OK Hrs :	76299
TURBINE OK Hrs :	75086
YAWING HR :	2386
VOLTAGE :	405
CURRENT :	319
FREQUENCY :	49.94
POWER FACTOR :	0.99
PITCH :	-1.1
GENERATOR TEMPREATURE :	76
AMBIENT TEMPREATURE :	24
NACELLE TEMPREATURE :	32
CONTROLLER TEMPREATURE :	42
HYDRAULIC TEMPREATURE :	41
GEARBOX TEMPREATURE :	63
MAIN BEARING TEMPREATURE :	71

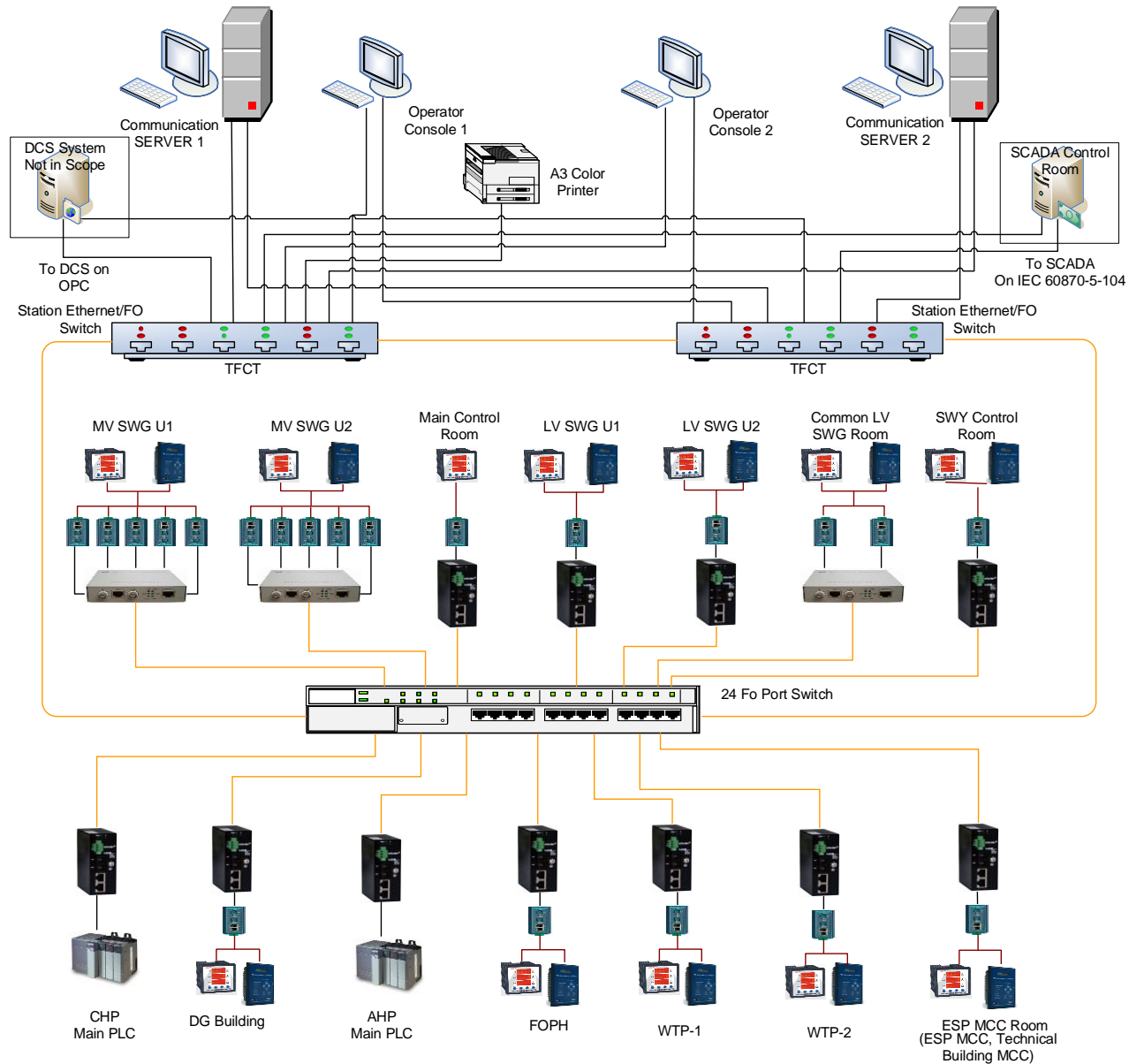
TURBINE STATUS

COMMAND

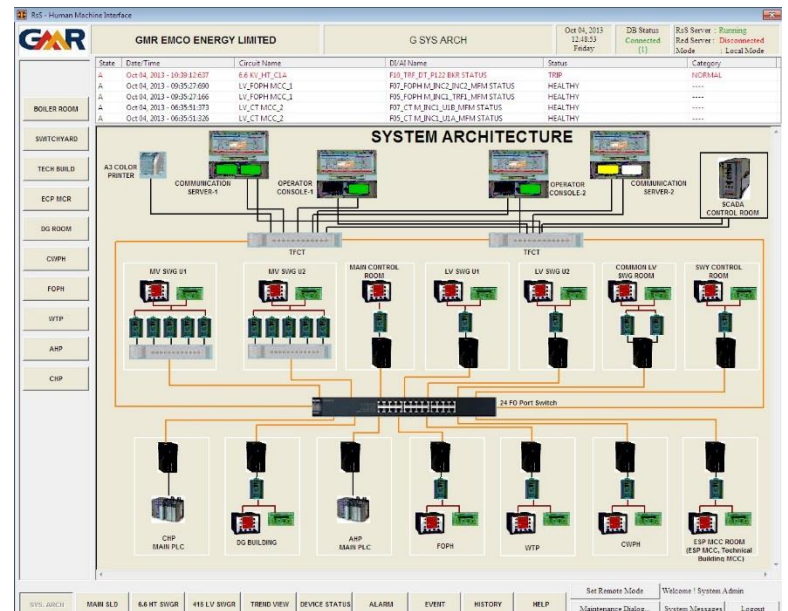
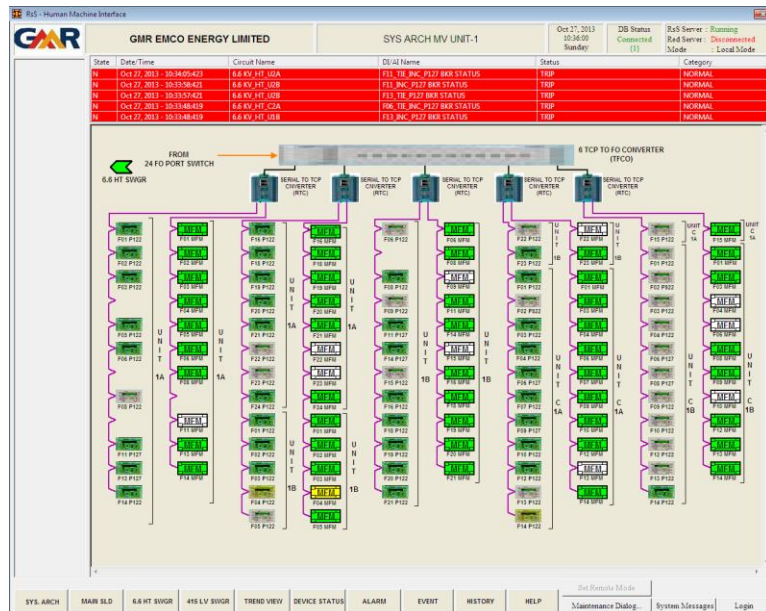
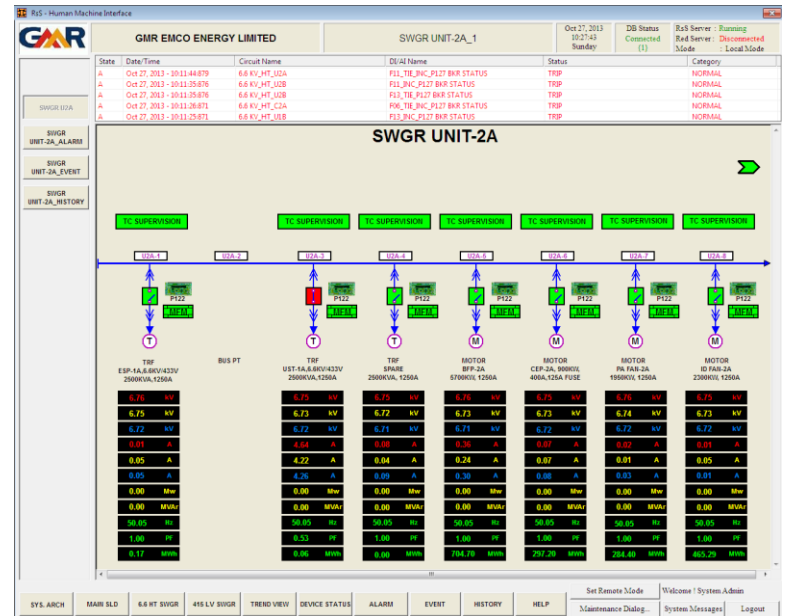
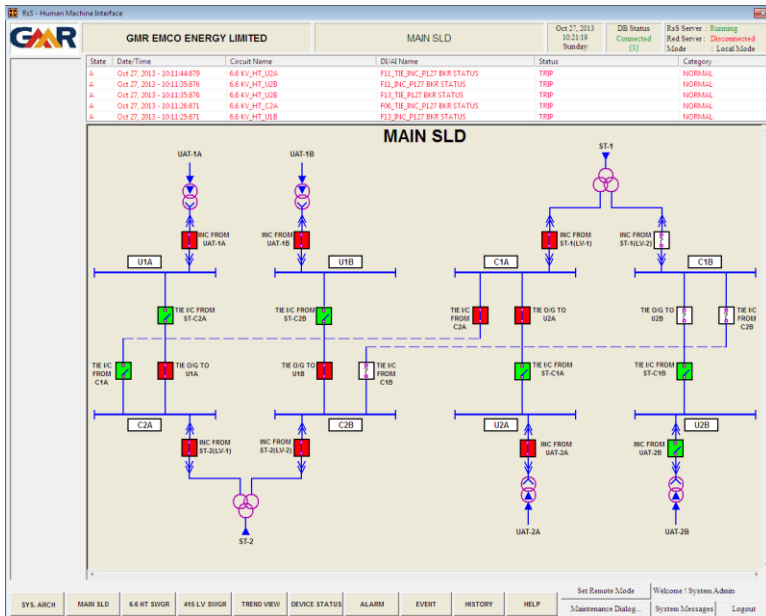
START STOP RESET

ENERATOR SPEED ROTOR SPEED Wind Speed

EMS Sample System Architecture



Sample Key System Views



EMS Application Views

Load Profile

Settings

- Profiles
 - p1
 - p3
 - p1
 - Load profile
 - View

	Timer Block	Surajpur			RC Green			Total Schedule Power	Total Load Drawl	Total U
		Schdule Power	Load Drawl	Unuse Power	Schdule Power	Load Drawl	Unuse Power			
1	0:00	56.64	52.02	4.62	143.01	130.85	12.16	199.65	182.87	16.78
2	0:15	56.64	52.73	3.91	143.01	141.55	1.46	199.65	194.28	5.37
3	0:30	56.64	46.77	9.87	143.01	151.25	-8.24	199.65	198.02	1.63
4	0:45	56.64	45.54	11.10	143.01	154.80	-11.79	199.65	200.34	-0.69
5	1:00	56.64	38.01	18.63	143.01	155.25	-12.24	199.65	193.26	6.39
6	1:15	56.64	45.36	11.28	143.01	152.70	-9.69	199.65	198.06	1.59
7	1:30	56.64	47.52	9.12	143.01	149.35	-6.34	199.65	196.87	2.78
8	1:45	56.64	51.37	5.27	143.01	147.25	-4.24	199.65	198.62	1.03
9	2:00	56.64	57.93	-1.29	133.54	140.80	-7.26	190.18	198.73	-8.55
10	2:15	56.64	57.50	-0.86	133.54	136.95	-3.41	190.18	194.45	-4.27
11	2:30	56.64	57.83	-1.19	133.54	136.70	-3.16	190.18	194.53	-4.35
12	2:45	56.64	56.44	0.20	133.54	134.85	-1.31	190.18	191.29	-1.11
13	3:00	56.64	54.97	1.67	133.54	133.40	0.14	190.18	188.37	1.81
14	3:15	56.64	53.38	3.26	133.54	133.80	-0.26	190.18	187.18	3.00
15	3:30	56.64	52.59	4.05	133.54	133.55	-0.01	190.18	186.14	4.04
16	3:45	56.64	54.02	2.62	133.54	133.50	0.04	190.18	187.52	2.66
17	4:00	56.64	54.00	2.64	127.86	133.35	-5.49	184.50	187.35	-2.85
18	4:15	56.64	54.81	1.83	127.86	131.95	-4.09	184.50	186.75	-2.25
19	4:30	56.64	54.89	1.75	127.86	130.40	-2.54	184.50	185.29	-0.79
20	4:45	56.64	55.63	1.01	127.86	129.30	-1.44	184.50	184.93	-0.43
21	5:00	56.64	53.35	3.29	118.39	129.00	-10.61	175.03	182.35	-7.32
22	5:15	56.64	52.31	4.33	118.39	128.35	-9.96	175.03	180.66	-5.63
23	5:30	56.64	51.42	5.22	118.39	127.20	-8.81	175.03	178.62	-3.59
24	5:45	56.64	52.42	4.22	118.39	125.65	-7.26	175.03	178.07	-3.04
25	6:00	56.64	55.71	0.93	113.65	125.50	-11.85	170.29	181.21	-10.92
26	6:15	56.64	52.58	4.06	113.65	121.35	-7.70	170.29	173.93	-3.64
27	6:30	56.64	52.39	4.25	113.65	119.90	-6.25	170.29	172.29	-2.00
28	6:45	56.64	51.72	4.92	113.65	119.10	-5.45	170.29	170.82	-0.53
29	7:00	56.64	53.00	3.64	118.39	117.70	0.69	175.03	170.70	4.33
30	7:15	56.64	49.59	7.05	118.39	120.85	-2.46	175.03	170.44	4.59
31	7:30	56.64	45.71	10.93	118.39	123.15	-4.76	175.03	168.86	6.17
32	7:45	56.64	47.00	9.64	118.39	122.15	-3.76	175.03	169.15	5.88
33	8:00	56.64	43.38	13.26	94.71	119.25	-24.54	151.35	162.63	-11.28
34	8:15	56.64	47.83	8.81	94.71	112.75	-18.04	151.35	160.58	-9.23
35	8:30	56.64	53.28	3.36	94.71	119.60	-24.89	151.35	172.88	-21.53
36	8:45	56.64	55.59	1.05	94.71	113.60	-18.89	151.35	169.19	-17.84
37	9:00	56.64	56.87	-0.23	104.18	116.85	-12.67	160.82	173.72	-12.90
38	9:15	56.64	57.14	-0.50	104.18	119.45	-15.27	160.82	176.59	-15.77
39	9:30	56.64	55.97	0.67	104.18	118.30	-14.12	160.82	174.27	-13.45

EMS Report Views

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Date:16/06/14														
2															
3		Surajpur			RC Green										
4	Timer Block	Schedule Power	Load Drawl	Unuse Power	Schedule Power	Load Drawl	Unuse Power	Total Schedule Power	Total Load Drawl	Unuse Power	Shut down	Breakdown		Unrestrict ed Load	
5												33 KV	11KV		
6															
7	0:00	56.64	52.02	4.62	143.01	130.85	12.16	199.65	182.87	16.78	0	0	0	182.87	
8	0:15	56.64	52.73	3.91	143.01	141.55	1.46	199.65	194.28	5.37	0	0	0	194.28	
9	0:30	56.64	46.77	9.87	143.01	151.25	-8.24	199.65	198.02	1.63	0	3	0	201.02	
10	0:45	56.64	45.54	11.10	143.01	154.80	-11.79	199.65	200.34	-0.69	0	3	0	203.34	
11	1:00	56.64	38.01	18.63	143.01	155.25	-12.24	199.65	193.26	6.39	0	8	0	201.26	
12	1:15	56.64	45.36	11.28	143.01	152.70	-9.69	199.65	198.06	1.59	0	3	0	201.06	
13	1:30	56.64	47.52	9.12	143.01	149.35	-6.34	199.65	196.87	2.78	0	3	0	199.87	
14	1:45	56.64	51.37	5.27	143.01	147.25	-4.24	199.65	198.62	1.03	0	3	0	201.62	
15	2:00	56.64	57.93	-1.29	133.54	140.80	-7.26	190.18	198.73	-8.55	0	3	0	201.73	
16	2:15	56.64	57.50	-0.86	133.54	136.95	-3.41	190.18	194.45	-4.27	0	3	0	197.45	
17	2:30	56.64	57.83	-1.19	133.54	136.70	-3.16	190.18	194.53	-4.35	0	3	0	197.53	
18	2:45	56.64	56.44	0.20	133.54	134.85	-1.31	190.18	191.29	-1.11	0	3	0	194.29	
19	3:00	56.64	54.97	1.67	133.54	133.40	0.14	190.18	188.37	1.81	0	3	0	191.37	
20	3:15	56.64	53.38	3.26	133.54	133.80	-0.26	190.18	187.18	3.00	0	3	0	190.18	
21	3:30	56.64	52.59	4.05	133.54	133.55	-0.01	190.18	186.14	4.04	0	3	0	189.14	
22	3:45	56.64	54.02	2.62	133.54	133.50	0.04	190.18	187.52	2.66	0	3	0	190.52	
23	4:00	56.64	54.00	2.64	127.86	133.35	-5.49	184.50	187.35	-2.85	0	3	0	190.35	
24	4:15	56.64	54.81	1.83	127.86	131.95	-4.09	184.50	186.75	-2.25	0	3	0	189.75	
25	4:30	56.64	54.89	1.75	127.86	130.40	-2.54	184.50	185.29	-0.79	0	3	0	188.29	
26	4:45	56.64	55.63	1.01	127.86	129.30	-1.44	184.50	184.93	-0.43	0	3	0	187.93	
27	5:00	56.64	53.35	3.29	118.39	129.00	-10.61	175.03	182.35	-7.32	0	3	0	185.35	
28	5:15	56.64	52.31	4.33	118.39	128.35	-9.96	175.03	180.66	-5.63	0	3	0	183.66	
29	5:30	56.64	51.42	5.22	118.39	127.20	-8.81	175.03	178.62	-3.59	0	3	0	181.62	
30	5:45	56.64	52.42	4.22	118.39	125.65	-7.26	175.03	178.07	-3.04	0	3	0	181.07	
31	6:00	56.64	55.71	0.93	113.65	125.50	-11.85	170.29	181.21	-10.92	0	3	0	184.21	
32	6:15	56.64	52.58	4.06	113.65	121.35	-7.70	170.29	173.93	-3.64	0	3	0	176.93	
33	6:30	56.64	52.39	4.25	113.65	119.90	-6.25	170.29	172.29	-2.00	0	3	0	175.29	

Sheet1

Sheet2

Sheet3



READY

EMS Realtime Views

N	Sep 16, 2014 - 16:42:03:763	<System>	FRTU_CALCUM_MODE_GTW	CONNECTED	----
N	Sep 16, 2014 - 16:42:03:139	<System>	FRTU_SEEMA_O2_GTW	CONNECTED	----
N	Sep 16, 2014 - 16:42:00:861	<System>	FRTU_FRAGTI_GTW	CONNECTED	----
N	Sep 16, 2014 - 16:41:59:800	33/11KV_K.P-3_SS	11KV-2_MFM	DISCONNECTED	----
N	Sep 16, 2014 - 16:41:53:045	<System>	FRTU_ANSAL_HOUSE_GTW	DISCONNECTED	SYSTEM

ACTIVE POWER
196.16 MW

REACTIVE POWER
-2.98 MVAR

FREQUENCY
50.07 Hz

220KV RC GREEN SUBSTATION

ACTIVE POWER	196.16 MW	REACTIVE POWER	-2.98 MVAR	220KV BUS VOLT.	200.25 KV	RC GREEN MAIN SLD
132KV BUS VOLT.	130.96 KV	33KV BUS VOLT.	13.86 KV	RC9 ACT. POWER	1.36 MW	
RC10 ACT. POWER	1.33 MW	RC11 ACT. POWER	1.89 MW	RC12 ACT. POWER	1.36 MW	
RC13 ACT. POWER	1.86 MW	RC14 ACT. POWER	1.87 MW	RC15 ACT. POWER	1.35 MW	

132KV SURAJPUR SUBSTATION

ACTIVE POWER	96.11 MW	REACTIVE POWER	1.81 MVAR	FREQUENCY	50.06 Hz	SURAJPUR MAIN SLD
132KV BUS VOLT.	130.96 KV	SUJ3 ACT. POWER	10.42 MW	SUJ4 ACT. POWER	1.31 MW	
SUJ5 ACT. POWER	1.36 MW	SUJ6 ACT. POWER	1.48 MW	SUJ7 ACT. POWER	1.31 MW	

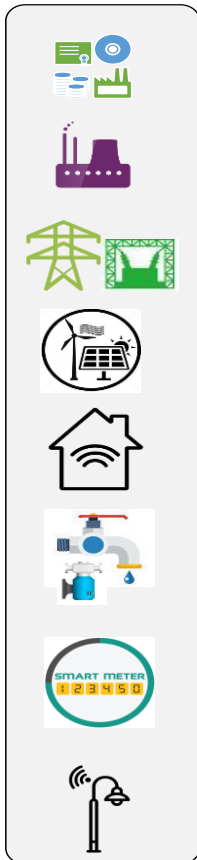
Real Time Values

11/11/201
1:52:35
Monday

Total Schedule	Total Drawl	Deviation	Deviation(%age)			
0	0	0	0			
220KV_R C GREEN_SS						
Block	Time	Frequency	Actual Schedule	Actual Drawl	Deviation	Deviation(%)
55	13:45-14:00					
132KV_SURAJPUR_SS						
Block	Time	Frequency	Actual Schedule	Actual Drawl	Deviation	Deviation(%)
55	13:45-14:00					

Product MAP

Sensors / Devices Plant Fields



Communication Middleware RBH ICx Gateway (USP)



Windows / Linux
Platforms



ICxRTU



Raspberry Pi



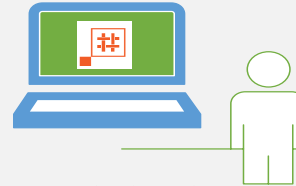
Arduino



IoT
Gateway

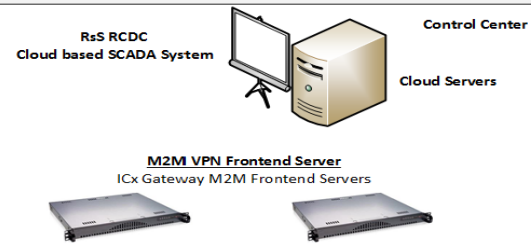
Any Type of Sensor /
Vendor / Technology
Supports 90% of
industrial communication
standards

Digital Dashboards/ Displays RBH RsS SCADA



Industry Standard Products
Dashboard / Reports / Interactive Plant
Operations / Monitoring / Control
System Alerts / Simulations

- Automation Platform
- Energy Management System
- Building Management System
- Substation Automation System
- Demand Management System
- Load Shedding Analytics



RBH Products

SCADA Systems

- Substation Automation
- Centralized Monitoring System

Metering Systems

- MDM / MDAS Solutions
- EMS Systems
- Metering Headend / Data Concentrators

Gateway Systems

- Gateway / Data Concentrator
- M2M / Remote Devices Connectivity over VPN
- IEC / MODBUS / DLMS / OPC / ICCP / DNP3 / MQTT

Networking Solutions

- Serial / Ethernet / Fiber Convertors
- Ethernet / Fiber Switches
- MODEMs

Solutions for Distribution Utility

- Substation Automation
 - Local SCADA and Centralized SCADA System
 - Support for IEC, MODBUS, DLMS, OPC Protocols
 - Gateway / RTU / FRTU Based
 - M2M / Secure VPN based Central Communication Platform
- RT-DAS – IPDS Projects
 - Control Center Infrastructure
 - Substation RTUs / FRTUs
 - SAIDI / SAIFI Calculations
- Meter Data Management Solution
 - VPN Enabled Secure / M2M enabled Headend System
 - Multi vendor / multi protocol (MODBUS / DLMS) support
 - DCU / Gateway based
- Automatic Demand Management System
 - Load Shedding
 - Outage Management System
 - FRTU / Gateway based

Solutions for Distribution Utility

- DT Transformer Monitoring Unit
 - Installation of DT Monitoring Unit
 - Centralized monitoring and remote tripping of DTs
 - Preventive Maintenance
- MDAS / Energy Management System
 - Metering data and billing solution
 - Utility Grade Billing and Management
 - Customer Portal and comprehensive accounts management solution
 - Data analysis and energy management
- FRTUs / DCU / Substation Gateways
 - Substation / RMU FRTUs
 - Metering Data Concentrators (DCUs)
 - Substation Alerts (SMS & Email) Solution
 - GPRS / 3G / 4G Modems and Routers

Key Customers



ALSTOM

SIEMENS

Schneider
Electric



ABB



Honeywell

A
AREVA

 **Chemtrols**



SEL

Atos




EMERSON



SATURN PYRO SDN. BHD.

Rockwell
Automation