Contents

Chapter-I

Energy Auditing

1.0 Introduction	
1.1 Importance of Energy	2
1.2 Need for Energy Conservation	2-3
1.3 Government Initiative for Energy Conservation	. 3-4
1.4 State level Energy Conservation activities	· 4
1.5 Energy Audit	4-5
1.6 Type of Energy Audit	6
1.6.1 Preliminary Energy Audit (PEA)	6
1.6.2 Detailed Energy Audit (DEA)	6-8
1.7 Identification of Energy Conservation Opportunities	9
1.8 Energy Audit Instrument	1.0
1.9 Objective and Methodology	10-12
Chapter II	
Lakwa Thermal Power Station	13-18
2.1 Study Area	14
2.2 Generation Capability of LTPS	15-16
Chapter III	
Secondary Data Collection and Analysis	19-43
3.1 Generation	20-22
3.2 Gas Turbine	23-26
3.3 Import/Export of the plant	27
3.4 Transformer	28-30
3.5 Lighting	31-32
3.6 Compressors	33-38
3.7 Pumps and Motors	38-41
3.8 Fans	41-43

Chapter IV

:

Primary Data Collection and Analysis	44-73	
4.1 Auxiliary Consumption	45-46	
4.2 Motors	46-52	
4.3 Air Conditioning	53-54	
4.4 Lighting	55-66	
4.5 over all Turbine Efficiency	67	
4.6 Skin loss from the turbine	68-70	
4.7 Compressors	71-73	
4.8 Transformers loss	73	
Chapter V		
Energy Conservation Opportunities in The Hub	74-79	
Chapter VI		
Energy Conservation Opportunity in	80-97	
DC court building, Nagaon		
6.1 Background	81	
6.2 Building Description	81-83	
6.3 Methodology adopted	83-84	
6.4 Scope of work	85-91	
6.5 Present Energy Scenario	91-93	
6.6 Energy conservation measures	93-94	
6.7 Good Engineering practices	94	
6.8 Annexure	96-98	
References	99	

•

List of Tables

Table No.	Title	page
3.1.1	Yearly Generation Data for last 30 years of LTPS	20-21
3.1.2	Monthly Generation Data for last 2 years in LTPS	21-22
3.2.1	Data regarding Generating Units of LTPS	24
3.2.2	Data For Units 1,2,3,4 AC Generator	25
3.3	Data for Generation/import of LTPS	27
3.4.1	Data of Transformers Installed in 3x20 MW Ph-II	28
3.4.2	Data for Transformers Installed in 4x15 MW Ph-I	29-30
3.5.1	Data for lighting system within the 3x20 MW Ph-II	31-32
3.5.2	Data for lighting system within the 4x15 MW Ph-I	32
3.6.1	Data For Compressors Used in Ph-II	34
3.6.2	Data For Compressors Used in Ph-II	34-35
3.6.3	Data For Compressors Used in Ph-II	35
3.6.4	Data For Compressors Used in Ph-II	36
3.6.5	Data For Compressors Used in Ph-II	37
3.6.6	Data For Clutch Air Compressor	37-38
3.6.7	Instrumental Air Compressor	38
3.7.1	Data For Water Pump	39
3.7.2	Pre Lubricating Oil Pump	39-40
3.7.3	Data For Primary Auxiliary Lubricating Oil Pump	40
3.7.4	Data For Secondary Auxiliary Lubricating oil Pump	41
3.7.5	Data For Main Lubricating Oil Pump	41
3.8.1	Data For Fans Used in turbine	42
3.8.2	Data For Fans Used in Gas Compressors	43
4.1	Monthly Generation Data of LTPS for last two years	45
4.4.1	Total Installed Lighting System in Ph-I	55
4.4.2	Total Installed Lighting System in Ph-II	55
4.4.3	Total Installed Street Lighting System in Colony	56
4.4.4	Measured Lux Level	65
4.5.1	Gas Turbine Unit 1, 2,3 Data during day Audit	67
4.5.2	Gas Turbine Unit 5,6,7 Data during day Audit	67

List of Figures

Figure No.

Title

.

1.1	Concept of Energy Audit	5 12
1.2	Methodology of Energy Audit	12
2.1	Location of LTPS	17
2.2	Single Line Diagram of LTPS	18
3.1	Monthly Generation for the plant	22
3.2	Schematic diagram of Gas Turbine arrangement	23
3.3	Plant Layout (Phase II)	26
3.4	Unit#4 in overhauling condition	26
3.5	Plant Layout (Phase I)	26
4.1	Auxiliary Consumption Data	46
4.2	Full load Vs Efficiency	51
4.3.1	condensers installed in the roof	53
4.3.2	condensers installed very near to the wall	53
4.3.3	Schematic diagram of Air conditioning system	- 54
4.1	Ph-I Control Room Day Audit	57
4.2	Ph-I Control Room Night Audit	58
4.3	Ph-I Gas Turbine Floor Night Audit	59
4.4	Ph-I Gas Turbine Floor Day Audit	60
4.5	Ph-II Control Room Day Audit	61
4.6	Ph-II Control Room Night Audit	62
4.7	Ph-II Gas Turbine Floor Day Audit	63
4.8	Ph-II Gas Turbine Floor Night Audit	64
4.9	Including bulbs in the control room panel	66
4.10	Comparative graph for surface temperature with heat loss	68
4.11	Skin loss in unit#3	70
4.12	Gas Compressor	73
5.1	Shopping Mall (The Hub)	75
6.1	DC court building Nagaon	82
6.2 6.3	Distribution transformer in Court Campus AC used in the office	85 88
0.5	Ac used in the office	. 00