PERFORMANCE EVALUATION REPORT PUBLIC SECTOR GENERATION COMPANIES

Jamshoro Power Company Limited (JPCL, GENCO-I) Central Power Generation Company Limited (CPGCL, GENCO-II) Northern Power Generation Company Limited (NPGCL, GENCO-III) Lakhra Power Generation Company Limited (LPGCL, GENCO-IV)



NATIONAL ELECTRIC POWER REGULATORY AUTHORITY



2016-17 2017-18

Table of Contents

S.No.	Description	Page No.
Execut	ive Summary	1
1	Performance Standards (Generation) Rules, 2009	5
2	Introduction	
2.1	Jamshoro Power Company Limited (GENCO I)	
2.1.1	Thermal Power Station Jamshoro (Units 1 to 4)	7
2.1.2	Thermal Power Station Jamshoro (Units 5 & 6)	8
2.1.3	Gas Turbine Power Station Kotri	9
2.2	Central Power Generation Company Limited (GENCO II)	
2.2.1	Thermal Power Station Guddu	10
2.2.2	Guddu 747 Combined Cycle Power Plant	11
2.3	Northern Power Generation Company Limited (GENCO III)	
2.3.1	Thermal Power Station Muzaffargarh	12
2.3.2	Gas Turbine Power Station Faisalabad	13
2.3.3	Steam Power Station Faisalabad	13
2.3.4	Combined Cycle Power Plant Nandipur	13
2.4	Lakhra Power Generation Company Limited (GENCO IV)	14
3	Analysis	
3.1	Reduction in Net Capacity	16
3.2	Availing Higher Outage Hours	20
3.3	Longer Duration of Standby Mode	23
3.4	Reduction in Availability Factor	25
3.5	Net Capacity Factor	28
3.6	Net Output Factor	29
3.7	Energy Availability Factor	30
4	Annexures	
<u> </u>	Energy Loss and Financial Impact of Reduction in Net Capacity	
П	Unused Energy Potential and Subsequent Energy Cost due to Availing Higher Outage Hours	
Ш	Energy Loss and Financial Impact of Auxiliary Consumption during Standby Mode	
IV	Unit wise data pertaining to Net Capacity Factor, Net Output Factor, Energy Availability Factor	

EXECUTIVE SUMMARY

National Electric Power Regulatory Authority (NEPRA) regulates the power sector in Pakistan and protects the interests of consumers and companies providing electric power services. As such, apart from monitoring the performance of transmission and distribution licensees, NEPRA also monitors the performance of generation licensees.

NEPRA framed Performance Standards Generation Rules (PSGR) back in 2009. Under PSGR, each operational generation licensee is required to submit a quarterly report to NEPRA on regular basis, particularly with respect to parameters such as Reference Capacity/Net Capacity, Planned/Unplanned Outage Hours, Availability Factor, Net Capacity Factor, Net Output Factor and Energy Availability Factor. The main purpose/objective of these parameters is to ascertain whether;

- i. The net capacity of power plant remained equal/higher to that approved by NEPRA in its tariff determination or otherwise.
- ii. The power plant availed outages in accordance with the Power Purchase Agreement signed with CPPA-G or otherwise.
- iii. The CPPA-G imposed Liquidated Damages on non-performance of power plant or otherwise.
- iv. The power plant remained under-utilized or otherwise.

Accordingly, the quarterly reports submitted by public sector GENCOs for the FY 2016-17 and 2017-18 were reviewed and a comprehensive Performance Evaluation Report has been prepared. The report mainly highlights the following key findings;

Reduction in Net Capacity: The data submitted by GENCOs for the FY 2016-17 and 2017-18 reflects that a number of units/machines of different power stations of GENCOs have failed to ensure the Net Capacity as approved by NEPRA in their respective tariff determinations (upon which they are receiving capacity payments). This resulted into a cumulative energy loss of about 479.573 Million kWh, translating into a financial impact of Rs.4.025 Billion, as per the following details;

GENCO	Energy Loss (Million kWh)	Financial Impact (Rs. Billion)		
I	66.270	0.635		
II	195.554	1.219		
III	204.649	2.118		
IV	13.100	0.053		
Total	479.573	4.025		



These units include <u>Units 1 to 4 of TPS Jamshoro</u> (GENCO-I), <u>Units 3, 5, 6, 11 & 12</u> of TPS Guddu & <u>Unit 15 of Guddu 747 CCPP</u> (GENCO-II), <u>Units 1, 4 & 5 of TPS</u> <u>Muzaffarqarh</u>, <u>Unit 9 of GTPS Faisalabad</u>, <u>Unit 2 of SPS Faisalabad</u> & <u>Nandipur</u> <u>Power Plant</u> (GENCO-III) and <u>Units 1 & 2 of Lakhra Power Station</u> (GENCO-IV).

Availing Higher Outages/Reduction in Availability Factor: The data submitted by GENCOs for the FY 2016-17 and 2017-18 indicates that a number of units/machines of different power stations of GENCO-I, II & III availed higher outage hours than allowed limit as specified in their respective Power Purchase Agreements, resulting in reduction of their Availability Factor. Had these units not availed higher outage hours, a huge amount of energy - around 9373.003 Million kWh could have been contributed by them to the national grid (subject to dispatch by the system operator), amounting to Rs. 64.629 Billion as per the following details;

GENCO	Energy Loss (Million kWh)	Financial Impact (Rs. Billion)
I	21.946	0.190
II	7542.448	48.502
III	1808.609	15.937
Total	9373.003	64.629

These units include <u>Unit 2 of TPS Jamshoro</u> & <u>Units 3 & 5 of GTPS Kotri</u> (GENCO-I), <u>Units 1, 2, 4, 7, 8, 9, 11 & 13 of TPS Guddu</u> & <u>Units 14, 15 & 16 of Guddu 747 CCPP</u> (GENCO-II) and <u>Units 4, 5 & 6 of TPS Muzaffarqarh</u>, <u>Unit 1 of SPS Faisalabad</u> & <u>Nandipur Power Plant</u> (GENCO-III).

It is pertinent to mention that CPPA-G has imposed liquidated damages amounting to **Rs. 2.093 Billion** on GENCO-I, II & III, on account of availing higher outages that allowed limit as specified in their respective Power Purchase Agreements during the FY 2016-17. However, the same is still in process for the FY 2017-18.

iii. Longer Duration of Standy Mode: The data submitted by GENCOs for the FY 2016-17 and 2017-18 shows that a number of units/machines of different power stations of GENCO-I, II & III remained on standy mode for an alarming longer duration, which resulted in the consumption of auxiliary power and a subsequent financial loss of around Rs. 1.031 Billion to the national exchequer.

On enquiry from GENCOs in this regard, it was revealed that instructions from the system operator (NPCC) due to no demand and fuel constraints were the major reasons of such longer duration of standby mode.



iv. Net Capacity Factor: The Net Capacity Factor is the ratio of net actual generation to the product of net capacity and period hours.

The data pertaining to Net Capacity Factor, as submitted by public sector GENCOs for the FY 2016-17 and 2017-18, reveals that the Net Capacity Factor of all the GENCOs remained low **(less than 68%)** during the said period, owing to increased duration of outages and underutilization of power plants. Particularly, the Net Capacity Factor of GTPS Kotri (GENCO-I), GTPS & SPS Faisalabad (GENCO-III) and Lakhra PS (GENCO-IV) remained only **10%**, **6%**, **1%** and **2%** respectively during the FY 2017-18, which raises serious question marks on the performance of these power stations.

 Net Output Factor: The Net Output Factor is the ratio of net actual generation to the product of net capacity and service hours. Its value should be nearly equal to 100%.

The data pertaining to Net Output Factor as submitted by public sector GENCOs for the FY 2016-17 and 2017-18, depicts that the Net Output Factor of TPS Guddu & Guddu 747 (GENCO-II) and TPS Muzaffargarh & Nandipur Power Plant (GENCO-III) remained low **(less than 80%)** during the FY 2016-17 and 2017-18. Similarly, the Net Output Factor of TPS Jamshoro & GTPS Kotri (GENCO-I) remained only **71%** and **76%** respectively during the FY 2017-18 and that of Lakhra Power Station (GENCO-IV) remained only **66%** during the FY 2016-17, which clearly speaks of the underutilization of these power plants during the said period.

Concluding, it can be said that as a result of successive legal actions taken by NEPRA on nonperformance of GENCO-I, II & III during the calendar years 2012 to 2014 (resulting in imposition of Rs. 5 Million each on GENCO-I, II & III) and during the fiscal years 2015 and 2016 {(resulting in imposition of Rs. 2 Million fine each on GENCO-I & II (legal proceedings against GENCO-III are currently under process)}, the performance of abovementioned GENCOs has considerably been improved during the FY 2016-17 and 2017-18. However, the same is still beyond the targets as approved by NEPRA in their respective tariff determinations with respect to reduction in net capacity and as specified in their respective Power Purchase Agreements signed with CPPA-G with respect to availing higher outages.

PERFORMANCE STANDARDS (GENERATION) RULES, 2009

1. Performance Standards (Generation) Rules (PSGR) 2009

In exercise of the Powers conferred by and clause (k) of section 46 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997), read with clause (c) of sub section (2) of section 7 and section 34 thereof, the National Electric Power Regulatory Authority (NEPRA), with the prior approval of the Federal Government, is pleased to make the following Rules to ensure that the electric generation facilities and power plants are efficiently operated to further ensure electrical service reliability and adequacy to the transmission and distribution service provider within prescribed parameters of Performance Standards (Generation) Rules (PSGR) 2009.

Quality of Supply - Rule 3 of PSGR 2009 states that "In order to maintain Performance Standards, the generation facilities are required to ensure that the voltage and frequency of electricity supplied to recipients shall be within normal operation limits contained in the 'applicable documents' as defined in clause (iv) of sub rule 1 of rule 2 NEPRA Licensing (Generation) Rules, 2000, rules 7 & 8 of NEPRA Performance Standards (Transmission) Rules 2005 and NEPRA clauses (d) & (e) of the rule 4 of Performance Standards (Distribution) Rules 2005".

Data Requirement - Rule 4 of PSGR 2009 states that "As part of Generator Performance Data System, the licensee shall calculate the following key indicators and others as indicated in Forms I and II to these rules for its generating facilities and submit on regular basis, a report to the Authority under sub-rule (2) of rule 5, namely:-

- (a) Energy Loss Rate (ELR)
- (b) Energy Availability Factor (EAF)
- (c) Equivalent Planned Outage Factor (EPOF)"

Reporting Requirement - Rule 5 (2) of PSGR 2009 states that "Reports required for the key indicators under rule 4 shall be submitted on quarterly basis and the first report thereof shall be due after the publication of these rules in the official Gazette.



2. INTRODUCTION:

2.1 Jamshoro Power Company Limited (JPCL, GENCO-I)

2.1.1 Thermal Power Station Jamshoro (Units 1 to 4):

S.No.	Deta	ails of	Generation Facilit	Ŷ		
1.	License Issuance Date		July 01, 2002			
2.	License Expiry Date		June 3	0, 2021		
3.	License Number		GL/01	/2002		
4.	Location of Plant		Jamsho	ro, Sindh		
5.	Type of Facility	Thermal Power Plant				
6.	Installed Capacity	880 MW				
7.	Net Capacity		649.0	2 MW		
0	Number of Units	Л	Steam Turbines	3*210 MW		
8.	Number of Units	4	Steam rurbines	1*250 MW		
9.	Primary Fuel	Furnace Oil				
10	Altornato Fuel	Unit 1 Nil		Nil		
10.	Alternate Fuel		Units 2 to 4	Natural Gas		
	Table 1					

Table 1



Figure 1

Performance Evaluation Report of Public Sector GENCOs

S.No.	Details of Generation Facility					
1.	License Issuance Date	August 11, 2014				
2.	License Expiry Date	D	ecember	30, 2049		
3.	License Number		GL/01/2	2002		
4.	Location of Plant		Jamshoro	, Sindh		
5.	Type of Facility	Thermal Power Plant		wer Plant		
6.	Installed Capacity	1320 MW		٨W		
7.	Net Capacity		1200 N	٨W		
8.	Number of Units	Steam T	urbine	2*660 MW		
9.	Primary Fuel	In	nported/L	ocal Coal		
10.	Alternate Fuel	Nil				
11.	Expected COD	Unit 5	Decei	mber 31, 2018		
11.	Expected COD	Unit 6	Decei	mber 31, 2019		

2.1.2 Thermal Power Station Jamshoro (Units 5 & 6):





Figure 2

S.No.	Details of Generation Facility				
1.	License Issuance Date		July 01, 2002		
2.	License Expiry Date		June 30, 2021	-	
3.	License Number		GL/01/2002		
4.	Location of Plant	Kotri, Sindh			
5.	Type of Facility	Combined Cycle			
6.	Installed Capacity		144 MW		
7.	Net Capacity		106.5 MW		
8.	Number of Units	E	Gas Turbines	4*25 MW	
0.	Number of Onits	5 Steam Turbine 1*44 MW		1*44 MW	
9.	Primary Fuel	Natural Gas			
10.	Alternate Fuel	High Speed Diesel			

2.1.3 Gas Turbine Power Station Kotri:

Table 3



Figure 3

2.2 Central Power Generation Company Limited (CPGCL, GENCO-II)

2.2.1 Thermal Power Station Guddu:

S.No.		Deta	ails of Generation I	acility	1	
1.	License Issuance Date	July 01, 2002				
2.	License Expiry Date		June 30, 2017			
3.	License Number			GL/02	/2002	
4.	Location of Plant		Jao	cobaba	ad, Sindh	
5.	Type of Facility	Thermal				
6.	Installed Capacity	1655 MW				
7.	Net Capacity			1400	MW	
8.	Number of Units	13	Gas Turbines	2*12	10+2*210+4*100+2*136 MW	
0.	Number of Onits	12	Steam Turbines		2*100+1*143 MW	
9.	Primary Fuel			Natur	al Gas	
10	Altornata Fuel	Units 3 & 4 Furnace Oil				
10.	10. Alternate Fuel		Other Units		Nil	
			Table 4		·,	



Figure 4

2.2.2 Guddu 747 Combined Cycle Power Plant:

S.No.	Details of Generation Facility				
1.	License Issuance Date		April 26, 2013		
2.	License Expiry Date		June 30, 20)17	
3.	License Number		GL/02/20	02	
4.	Location of Plant		Jacobabad, Sindh		
5.	Type of Technology	Combined Cycle			
6.	Installed Capacity		776.7 MV	N	
7.	Net Capacity		720.79 M	W	
8.	Number of Units	Gas Turbines 2*255.6 MV		2*255.6 MW	
0.	Number of Omits	3 Steam Turbine 1*265.5 MW			
9.	Primary Fuel	Natural Gas			
10.	Alternate Fuel	High Speed Diesel Oil			

Table 5



Figure 5

2.3 Northern Power Generation Company Limited (NPGCL, GENCO-III)

2.3.1 Thermal Power Station Muzaffargarh:

S.No.		Details of Generation Facility				
1.	License Issuance Date	July 01, 2002				
2.	License Expiry Date		June 30	0, 2027		
3.	License Number	GL/03/2002				
4.	Location of Plant	Muzaffargarh, Punjab				
5.	Type of Facility	Thermal				
6.	Installed Capacity		1350	MW		
7.	Net Capacity		1183.5	52 MW		
8.	Number of Units	6	Steam Turbines	3*210+1*320+2*200 MW		
9.	Primary Fuel	Furnace Oil				
10.	Alternate Fuel		Natur	al Gas		





Figure 6

S.No.	Details of Generation Facility				
1.	License Issuance Date		July 01, 20	002	
2.	License Expiry Date		June 30, 2	027	
3.	License Number		GL/03/20	02	
4.	Location of Plant	Faisalabad, Punjab			
5.	Type of Facility	Combined Cycle			
6.	Installed Capacity		144 MV	V	
7.	Net Capacity		132 MV	V	
0	Number of Units	г	Gas Turbines	4*25 MW	
8.	Number of Onits	5 Steam Turbine 1*44 MW			
9.	Primary Fuel	Natural Gas			
10.	Alternate Fuel	High Speed Diesel			

2.3.2 Gas Turbine Power Station Faisalabad:

Table 7

2.3.3 Steam Power Station Faisalabad:

S.No.	Details of Generation Facility				
1.	License Issuance Date		July 01, 2002		
2.	License Expiry Date		June 30, 2027		
3.	License Number		GL/03/2002		
4.	Location of Plant	Faisalabad, Punjab			
5.	Type of Facility	Thermal			
6.	Installed Capacity		132 MW		
7.	Net Capacity		97 MW		
8.	Number of Units	2 Steam Turbines 2*66 MW			
9.	Primary Fuel	Natural Gas			
10.	Alternate Fuel	Furnace Oil			

Table 8

2.3.4 Combined Cycle Power Plant Nandipur:

S.No.	Details of Generation Facility				
1.	License Issuance Date		October 31, 201	4	
2.	License Expiry Date		June 30, 2027		
3.	License Number		GL/03/2002		
4.	Location of Plant		Gujranwala, Punj	jab	
5.	Type of Facility	Combined Cycle			
6.	Installed Capacity	565.65 MW			
7.	Net Capacity		510 MW		
8.	Number of Units	Л	Gas Turbines	3*122.1 MW	
0.	Number of Onits	4 Steam Turbine 1*199.35 MW			
9.	Primary Fuel	Furnace Oil			
10.	Alternate Fuel	Natural Gas			
Table 9					



Figure 7

2.4 Lakhra Power Generation Company Limited (LPGCL, GENCO-IV):

S.No.	Details of Generation Facility							
1.	License Issuance Date		February 18, 2005					
2.	License Expiry Date		February 17, 202	20				
3.	License Number		GL/06/2005					
4.	Location of Plant	Dadu, Sindh						
5.	Type of Facility		Thermal					
6.	Installed Capacity		150 MW					
7.	Net Capacity		93 MW					
8.	Number of Units	3 Steam Turbines 3*50 MW						
9.	Fuel Type	Lignite Coal						

Table 10



Figure 8



3.1 Reduction in Net Capacity:

According to Performance Standards (Generation) Rules, 2009;

Net Capacity is the unit's maximum generating capacity based on IDC (Initial Dependable Capacity) or AIDC (Annual Initial Dependable Capacity) less any station service or auxiliary power requirements in MW utilized for that unit.

Net Capacity is determined when there are no short term equipment problems causing a temporary derating of the unit and all major equipment is operating at full load under designed temperatures and pressures.

While reviewing the quarterly reports submitted by public sector GENCOs for the FY 2016-17 and 2017-18, it has been observed that <u>the Net Capacity of a number of units/machines</u> <u>of different power stations of GENCOs remained lower than that approved by NEPRA in</u> <u>their respective tariff determinations</u>. This resulted into a cumulative energy loss of about **479.573 Million kWh**, translating into a financial impact of **Rs. 4.025 Billion**. The detail is as under;

Unit	Year			Net		Energy Loss	Financial Impact			
Onic		Installed	Actual	Approved	Reduction	(Million kWh)	(Rs. Billion)			
			1	2	3 = 2-1					
				GENCO I						
TPS Jamsho	TPS Jamshoro									
1	2016-17	250	181.70	182.45	0.75	4.752	0.046			
-	2017-18	230	180.36	102.45	2.09	7.646	0.086			
2	2016-17	200	154.16	154.73	0.57	2.930	0.030			
۷.	2017-18	200	154.21	134.75	0.52	1.551	0.016			
3	2016-17	200	154.16	155.36	1.2	7.408	0.067			
3	2017-18	200	154.38		0.98	3.776	0.038			
4	2016-17	200	153.54	156 40	2.94	21.946	0.198			
4	2017-18	200	153.29	156.48	3.19	16.261	0.154			
Overall	2016-17	850		649.02		37.036	0.341			
Overall	2017-18	850		049.02		29.235	0.294			
		Sub	Total			66.270	0.635			
GTPS Kotri										
3	2016-17	25	21.98	18	0	0	0			
	2017-18	23	21.97	10	0	0	0			
4	2016-17	25	21.98	18	0	0	0			
4	2017-18	23	21.98	10	0	0	0			
5	2016-17	25	21.79	18	0	0	0			
5	2017-18	25	21.76	10	0	0	0			

Table 11



			Сар	acity			
Unit	Year			Net		Energy Loss	Financial Impact
Onit	Tear	Installed	Actual	Approved	Reduction	(Million kWh)	(Rs. Billion)
			1	2	3 = 2-1		
6	2016-17	25	21.77	18	0	0	0
0	2017-18	25	21.76	10	0	0	0
7	2016-17	44	38.28	35	0	0	0
	2017-18	44	35.09	35	0	0	0
Overall	2016-17	144		107		0	0
Overall	2017-18	144		107		0	0
		Sub	Total			0	0
		То	tal			66.270	0.635
				GENCO II			
TPS Guddu							
1	2016-17	110	85	70	0	0	0
¥	2017-18	110	85	70	0	0	0
2	2016-17	110	85	70	0	0	0
۷	2017-18	110	85	70	0	0	0
3	2016-17	210	168.77	170	1.23	2.430	0.020
5	2017-18	210	165.22	170	4.78	10.408	0.060
4	2016-17	210	180	170	0	0	0
-	2017-18	210	180		0	0	0
5	2016-17	100	80.19	85	4.81	32.477	0.260
5	2017-18	100	81.49	65	3.51	29.173	0.198
6	2016-17	100	80.42	85	4.58	22.089	0.177
0	2017-18	100	81.69	65	3.31	26.677	0.181
7	2016-17	100	94.35	90	0	0	0
	2017-18	100	93.98	50	0	0	0
8	2016-17	100	94.29	90	0	0	0
0	2017-18	100	94.11	50	0	0	0
9	2016-17	100	94.10	90	0	0	0
<u>y</u>	2017-18	TOO	94.02	50	0	0	0
10	2016-17	100	94.07	90	0	0	0
	2017-18	100	93.96	50	0	0	0
11	2016-17	136	129.73	130	0.27	1.277	0.008
**	2017-18	130	129.61	130	0.39	1.293	0.007
12	2016-17	136	129.55	130	0.45	2.041	0.013
75	2017-18	130	129.4	130	0.6	4.583	0.024
13	2016-17	143	140	130	0	0	0
13	2017-18	т + 3	140	130	0	0	0
Overall	2016-17	1655		1400		60.315	0.478
	2017-18	1000		1700		72.134	0.471
		Sub	Total			132.449	0.948



	Capacity									
Unit	Year		Net			Energy Loss	Financial Impact			
	real	Installed	Actual	Approved	Reduction	(Million kWh)	(Rs. Billion)			
			1	2	3 = 2-1					
Guddu 747	ССРР									
14	2016-17	255.6	243	241.72	0	0	0			
14	2017-18	235.0	243	241.72	0	0	0			
15	2016-17	255.6	233.5	241.72	8.22	63.105	0.271			
15	2017-18	235.0	243	241.72	0	0	0			
16	2016-17	265.5	261	237.35	0	0	0			
10	2017-18	205.5	261	237.35	0	0	0			
Overall	2016-17	776.7		720.79		63.105	0.271			
Overall	2017-18	//0./		720.79		0	0			
		Sub	Total			63.105	0.271			
		То	tal			195.554	1.219			
				GENCO III						
TPS Muzaff	argarh									
1	2016-17	210	183.86	190	6.14	42.486	0.446			
Ŧ	2017-18	210	183.52	190	6.48	27.179	0.342			
2	2016-17	210	184.72 183.84	102 F	0	0	0			
2	2017-18	210		182.5	0	0	0			
2	2016-17	210	186.24	102 F	0	0	0			
3	2017-18	210	186.28	183.5	0	0	0			
	2016-17	220	266.37	272.2	5.83	35.476	0.372			
4	2017-18	320	266.7	272.2	5.5	22.687	0.286			
_	2016-17	200	180.24		1.2	6.634	0.070			
5	2017-18	200	181.58	181.44	0	0.000	0			
-	2016-17		177.84		0	0	0			
6	2017-18	200	179.02	173.88	0	0	0			
- "	2016-17					84.596	0.888			
Overall	2017-18	1350		1183.52		49.866	0.628			
		Sub ⁻	Total			134.462	1.517			
GTPS Faisal	abad									
	2016-17	25	22.86	20	0	0	0			
5	2017-18	25	22.83	20	0	0	0			
	2016-17	25	22.87		0	0	0			
6	2017-18	25	22.86	20	0	0	0			
_	2016-17		22.86		0	0	0			
7	2017-18	25	22.83	20	0	0	0			
•	2016-17	25	22.87		0	0	0			
8	2017-18	25	22.89	20	0	0	0			
•	2016-17		36.53		0.5	0.997	0.006			
9	2017-18	44	37.02	37	0	0	0			
• "	2016-17	46-				0.997	0.006			
Overall	2017-18	125		117		0	0			
	1	Sub	0.997	0.006						

Performance Evaluation Report of Public Sector GENCOs



	Capacity									
Unit	Year			Net		Energy Loss	Financial Impact			
	i eai	Installed	Actual	Approved	Reduction	(Million kWh)	(Rs. Billion)			
			1	2	3 = 2-1					
SPS Faisala	SPS Faisalabad									
1	2016-17	66	50	48.5	0	0	0			
-	2017-18	00	50	40.5	0	0	0			
2	2016-17	66	43.95	48.5	4.55	13.760	0.151			
2	2017-18	00	43.50	40.5	5	0.934	0.007			
Overall	2016-17	132		97		13.760	0.151			
Overall	2017-18	132		57		0.934	0.007			
		Sub	Total			14.694	0.159			
CCPP Nandi	ipur									
1	2016-17	425	401.83	411.34	9.51	44.871	0.359			
1	2017-18	425	410.03	411.54	1.31	9.625	0.077			
		Sub	Total			54.496	0.436			
		То	tal			204.649	2.118			
				GENCO IV						
Lakhra PS										
1	2016-17	50	28.4	31.2	2.8	0.797	0.003			
1	2017-18	50	25.52	51.2	5.68	0.336	0.002			
2	2016-17	50	28.4	31.2	2.8	11.161	0.045			
2	2017-18	50	25.52	31.2	5.68	0.807	0.004			
3	2016-17	50		31.2	F					
5	2017-18	50	-	31.2	F	REQUIRES REHABIL	ITATION			
Overall	2016-17	150		93.6		11.957	0.048			
Overall	2017-18	120		93.0		1.143	0.005			
		То	tal			13.100	0.053			
		Grand	l Total			479.573	4.025			

Note:

- 'Actual Net Capacity' has been worked out by deducting the auxiliary power (MW) consumed by the units/machines of GENCO-I, II, III & IV during service mode from the 'De-rated Capacity' as mentioned in their respective generation licenses.
- 'Approved Net Capacity' is the net capacity approved by NEPRA in the respective tariff determinations of abovementioned GENCOs.
- Energy Loss has been worked out by multiplying the reduction in net capacity to the service hours availed by the units/machines of GENCO-I, II, III, & IV.
- Similarly, the financial impact has been calculated by multiplying the energy loss to the selling rate of the units/machines of abovementioned GENCOs as worked out from the Energy Procurement Reports submitted by CPPA-G. The details are attached at **Annex I**.

3.2 Availing Higher Outage Hours:

According to Performance Standards (Generation) Rules 2009;

Outage Hours are the sum of Planned Outage Hours and Unplanned Outage Hours.

Where;

Planned Outage Hours are the sum of all hours the unit was offline due to planned or scheduled outages (outages planned well in advance such as annual overhauls); and

Unplanned Outage Hours are the sum of all hours the unit was offline due to sudden, delayed, postponed, startup failure outages.

While reviewing the quarterly reports submitted by public sector GENCOs for the FY 2016-17 and 2017-18, it has been observed that <u>a number of units/machines of different power</u> <u>stations of GENCO-I, II & III availed higher outage hours than allowed limit as specified in</u> <u>their respective Power Purchase Agreement</u>. Had these units not availed higher outage hours, they could have contributed around **9373.003 Million kWh** to the national grid (subject to dispatch by system operator) amounting to **Rs. 64.629 Billion**. The detail is as under;

					Table 12			
			Outage Hours (% of Period Hours)					Energy
Unit	Period		Actual		Allowed	Extra	Potential	Cost
onne	i choù	Planned	Forced	Total	Alloweu	LAUA	(Million kWh)	(Rs. Billion)
		1	2	3 = 1+2	4	5 = 3-4	6	7
				GEN	ICO I			
TPS Jams	horo							
2	2016-17	25	10	35	33.8	1.2	15.781	0.159
Z	2017-18							
124	2016-17				Within	Range		
1,3,4	2017-18							
			Sub Total				15.781	0.159
GTPS Kot	ri							
3	2016-17				Within	Range		
5	2017-18	0	20.4	20.4	17.4	3	4.697	0.020
5	2016-17	0	18.3	18.3	17.4	0.9	1.468	0.011
5	2017-18				Within	Range		
467	2016-17				\\/ithin	Pango		
4,6,7	2017-18				Within	Range		
			Sub Total				6.165	0.031
			Total				21.946	0.190



			Outage Ho	ours (% of Per	riod Hours)		Unused Energy	Energy
	De de l		Actual	•			Potential	Cost
Unit	Period	Planned	Forced	Total	Allowed	Extra	(Million kWh)	(Rs. Billion)
		1	2	3 = 1+2	4	5 = 3-4	6	7
				GEN	COII			
TPS Gudd	lu							
1	2016-17	0	100	100	17.4	82.6	506.800	4.155
1	2017-18	0	100	100	17.4	82.6	506.810	2.939
2	2016-17	0	100	100	17.4	82.6	506.800	4.155
2	2017-18	0	100	100	17.4	82.6	506.810	2.939
4	2016-17	0	100	100	17.4	82.6	1230.800	10.092
4	2017-18	0	100	100	17.4	82.6	1230.824	7.138
7	2016-17	23.8	1	24.8	17.4	7.4	58.932	0.471
7	2017-18				Within	Range		
0	2016-17	16.8	4	20.8	17.4	3.4	26.820	0.214
8	2017-18				Within	Range	· · · · ·	
0	2016-17	41.9	5.3	47.2	33.8	13.4	105.660	0.845
9	2017-18					D	· · · · · ·	
	2016-17				Within	Range		
11	2017-18	0	55.6	55.6	14.6	41	466.334	2.424
10	2016-17	0	100	100	16	84	956.800	6.123
13	2017-18	0	100	100	16	84	956.820	4.975
3,5,6,	2016-17				\ \ /:+h:	Danaa		
10,12	2017-18				Within	Kange		
			Sub Total				7060.209	46.477
Guddu 74	17							
1 /	2016-17				Within	Range		
14	2017-18	3.8	15.9	19.6	17.4	2.2	47.152	0.198
1 Г	2016-17				Within	Range	· · · · · · · · · · · · · · · · · · ·	
15	2017-18	1.5	16.1	17.6	17.4	0.2	4.083	0.017
10	2016-17				Within	Range	·	
16	2017-18	6.7	31.4	38.1	17.4	20.7	431	1.810
			Sub Total				482.239	2.025
			Total				7542.448	48.502
				GEN	CO III			
TPS Muza	affargarh							
4	2016-17	8.2	12.5	20.7	17.4	3.3	79.292	0.832
4	2017-18				Within	Pange		
5	2016-17				vvitiin	Nange		
	2017-18	8.5	13.4	21.9	17.4	4.5	71.830	0.905
6	2016-17				Within	Range		
0	2017-18	0	18.8	18.8	17.4	1.4	21.944	0.276
1,2,3	2016-17				Within	Range		
1,2,5	2017-18				vvitiilli	Nalige		

			Unused Energy	Energy				
Unit	Period		Actual		Allowed	Extra	Potential	Cost
onne	i chida	Planned	Forced	Total	Allowed	LAUA	(Million kWh)	(Rs. Billion)
		1	2	3 = 1+2	4	5 = 3-4	6	7
			Sub Total				173.066	2.014
GTPS Fais	alabad							
5,6,7,	2016-17				Within	Pango		
8,9	2017-18				VVILIIII	Nalige		
			Sub Total				0	0
SPS Faisa	labad							
1	2016-17	0	91.5	91.5	17.4	74.1	315.056	3.465
1	2017-18	0	100	100	17.4	82.6	350.934	2.702
2	2016-17				\\/i+hin	Dango		
Ζ	2017-18				Within	Range		
			Sub Total				665.990	6.167
CCPP Nar	ndipur							
1	2016-17	44.9	0.4	45.3	18.4	26.9	969.553	7.756
1	2017-18				Within	Range		
			Sub Total				969.553	7.756
			Total				1808.609	15.937
	Grand Total 9373.003 64.629							64.629

Note:

- 'Actual Outage Hours' are the outage hours availed by the units/machines of GENCO-I, II & III, as submitted by them in their quarterly performance reports.
- 'Allowed Outage Hours' are the outage hours allowed to the units/machines of GENCO-I, II & III, as specified in their respective Power Purchase Agreements signed with CPPA-G.
- Unused Energy Potential has been worked out by multiplying the extra outage hours availed by the units/machines of GENCO-I, II & III to the net capacity approved by NEPRA in their respective tariff determinations.
- Similarly, the Energy Cost has been calculated by multiplying the unused energy potential to the selling rate of the units/machines of abovementioned GENCOs as worked out from the Energy Procurement Reports submitted by CPPA-G. The details are attached at **Annex II**.

3.3 Longer Duration of Standby Mode:

While reviewing the quarterly reports submitted by public sector GENCOs for the FY 2016-17 and 2017-18, it has been observed that a number of units/machines of different power stations of GENCO-I, II & III remained on standby mode for an alarming longer duration, which resulted in the consumption of auxiliary power and a subsequent financial loss of around **Rs. 1.031 Billion** to the national exchequer **(Annex III)**.

In view of above, GENCO-I, II & III were asked to submit the reasons of such longer duration of standby mode. In response, following reasons were submitted by abovementioned GENCOs;

- i. Instructions from the system operator (NPCC) due to no demand.
- ii. Fuel Constraints.
- iii. River Water Conductivity.

The details are as under;

		Table 13			
Unit No.		Total Duration of Stan	dby Mode (Hours)		
Unit NO.	FY 2016-17	FY 2017-18	Reasons		
		GENCO I			
TPS Jamsho	ro				
1	802	3930	Instructions of the System Operator		
2	557	4459	(NPCC), River Water Conductivity		
3	1330	3982	and Shortage of Fuel		
4	1010	1918			
GTPS Kotri					
3	4104	5812	Non-availability of indigenous gas		
4	4472	7022	fuel from SSGC		
5	3630	7333			
6	4939	7387			
7	4088	7095			
		GENCO II			
TPS Guddu					
3	5773	6478	Non-availability of indigenous gas		
5	1826	-	supply, which is supplied from two		
6	2317	-	different gas fields i.e. Kandhkot		
7	1833	7	and Mari gas field		
8	1512	578			
9	65	355			
10	1947	491			
11	3924	577			
12	4339	579			

Unit No.	Total Duration of Standby Mode (Hours)						
Unit No.	FY 2016-17	FY 2017-18	Reasons				
		GENCO II					
Guddu 747	ССРР						
15	142	-	Non-availability of indigenous gas supply, which is supplied from two different gas fields i.e. Kandhkot and Mari gas field				
		GENCO III					
TPS Muzaff	argarh						
1	908	3722					
2	919	3726					
3	1233	3602	No demand from System Operator				
4	863	3656	(NPCC)				
5	1812	4183					
6	2305	4237					
GTPS Faisal	abad						
5	6578	7391	_				
6	6670	7327	No demand from System Operator				
7	6626	7453	(NPCC)				
8	6581	7727	(NFCC)				
9	5874	7407					
SPS Faisala	bad						
1	744	-	No demand from System Operator				
2	4644	7778	(NPCC)				
CCPP Nandi	pur						
Complex	55	917	No demand from System Operator (NPCC) and Non-availability of Gas Fuel				

3.4 Reduction in Availability Factor:

According to Performance Standards (Generation) Rules 2009;

 $Avaiability Factor = \frac{Available Hours}{Period Hours}$

Where;

Available Hours are the sum of Unit Service Hours, Reserve Shutdown Hours and Synchronous Condensing Hours (if applicable); and

Period Hours are the sum of Available Hours and Unavailable Hours (total of Planned Outage Hours and Unplanned Outage Hours).

While reviewing the quarterly reports submitted by public sector GENCOs for the FY 2016-17 and 2017-18, it has been observed that <u>the Availability Factor of a number of</u> <u>units/machines of different power stations of GENCO-I, II & III remained lower than that</u> <u>as worked out from their respective Power Purchase Agreements</u>. The same are highlighted in the tables given below;

llait	Deried	A	Availability Factor (%)					
Unit	Period	Actual	As per PPA	Reduction				
TPS Jams	noro							
1	2016-17	81.5	71.1	-				
	2017-18	86.6	71.2	-				
2	2016-17	65	66.2	1.2				
Z	2017-18	85	73.1	-				
3	2016-17	85.7	73.1	-				
3	2017-18	89.4	73.1	-				
4	2016-17	96.7	73.1	-				
4	2017-18	80.1	73.1	-				
GTPS Kot	ri							
3	2016-17	99.5	82.6					
5	2017-18	79.6	82.6	3				
4	2016-17	99.8	82.6					
4	2017-18	94.5	82.6					
5	2016-17	81.7	82.6	0.9				
5	2017-18	92.7	82.6					
C	2016-17	96.3	82.6					
6	2017-18	99.8	82.6					
7	2016-17	92	82.6					
/	2017-18	96.3	82.6					

Table 14.1 (GENCO I)



	Table 14.2 (GENCO II)								
		A	vailability Factor	· (%)					
Unit	Period	Actual	As per PPA	Reduction					
		1	2	3 = 1-2					
TPS Gudo	TPS Guddu								
1	2016-17	0	82.6	82.6					
L	2017-18	0	82.6	82.6					
2	2016-17	0	82.6	82.6					
2	2017-18	0	82.6	82.6					
2	2016-17	86.2	82.6	-					
3	2017-18	98.8	82.6	-					
	2016-17	0	82.6	82.6					
4	2017-18	0	82.6	82.6					
F	2016-17	90.6	86.8	-					
5	2017-18	94.9	86.8	-					
	2016-17	88	86.8	-					
6	2017-18	92	86.8	-					
	2016-17	75.2	82.6	7.4					
7	2017-18	94.1	82.7	-					
	2016-17	79.2	82.6	3.4					
8	2017-18	84.1	82.7	-					
	2016-17	52.8	66.2	13.4					
9	2017-18	95.6	82.7	-					
	2016-17	84.7	82.6	-					
10	2017-18	90.2	82.7	-					
	2016-17	95.8	85.4	-					
11	2017-18	44.4	85.4	41					
	2016-17	98.6	85.4	-					
12	2017-18	93.8	85.4	_					
	2016-17	0	84	84					
13	2017-18	0	84	84					
Guddu 74		-							
	2016-17	87.1	82.6	_					
14	2017-18	80.4	82.6	2.2					
	2016-17	88.4	82.6	-					
15	2017-18	82.4	82.6	0.2					
	2016-17	85.2	82.6	-					
16	2010 17	61.9	82.6	20.7					
	201/-10	01.5	02.0	20.7					

Table 14.2 (GENCO II)



Vinital Period Actual As per PPA Reduction 1 2 3=1.2 TPS Muz=Fire TPS Muz=Fire 1 2016-17 89.4 82.6 - 2017-18 90.4 82.6 - 2 2016-17 87.4 82.6 - 2 2016-17 87.4 82.6 - 2 2016-17 87.4 82.6 - 2 2016-17 87.5 82.6 - 3 2016-17 87.5 82.6 - 4 2017-18 91.1 82.6 - 2016-17 79.3 82.6 - 5 2016-17 83.7 82.6 - 6 2017-18 88.8 82.6 - 6 2016-17 88.1 82.6 - 6 2016-17 98.4 88.1 - 7 2016-17 99.5 88.1 <th></th> <th></th> <th></th> <th>(GENCO III)</th> <th></th>				(GENCO III)			
Image shows the section of the sect			A				
TPS Muze 2016-17 89.4 82.6 - 1 2016-17 89.4 82.6 - 2 2017-18 90.4 82.6 - 2 2016-17 87.4 82.6 - 2 2016-17 87.4 82.6 - 2 2017-18 90.3 82.6 - 2 2016-17 87.5 82.6 - 2017-18 91.1 82.6 - - 2017-18 91.1 82.6 - - 2016-17 83.7 82.6 - - 2016-17 83.7 82.6 - - 2016-17 83.7 82.6 - - 2016-17 88 82.6 - - 2016-17 88 82.6 - - 2016-17 99.5 88.1 - - 2016-17 99.7 88.1 - - 2016	Unit	Period	Actual	As per PPA			
2016-1789.482.6-2017-1890.482.6-2016-1787.482.6-2017-1890.382.6-32016-1787.582.6-2017-1891.182.62017-1891.182.642017-1888.882.6-52016-1783.782.6-62017-1888.882.6-783.782.62016-1783.782.6-62017-1878.182.6-72016-178882.6-62017-1881.282.6-72016-178882.6-62017-1891.588.1-72016-1799.588.1-72016-1799.588.1-72016-1799.588.1-72016-1799.588.1-72016-1799.588.1-82017-1899.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92017-1899.588.1-92016-1799.588.1-92016-1781.620.6-2017-1899.588			1	2	3 = 1-2		
12017-1890.482.6-22016-1787.482.6-2017-1890.382.6-32016-1787.582.6-2017-1891.182.63.342016-1779.382.63.32016-1788.882.6-52016-1783.782.6-62017-1888.882.6-783.782.662016-1788.882.6-72016-1788.182.6-62017-1881.282.6-72016-1788.182.6-62017-1899.588.1-72016-1799.588.1-62017-1899.588.1-72016-1799.588.1-72016-1799.588.1-72016-1799.588.1-82016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.588.1-9 </td <td>TPS Muza</td> <td></td> <td></td> <td></td> <td></td>	TPS Muza						
2017-18 90.4 82.6 - 2 2016-17 87.4 82.6 - 2017-18 90.3 82.6 - 3 2016-17 87.5 82.6 - 3 2016-17 87.5 82.6 - 4 2017-18 91.1 82.6 - 4 2017-18 91.1 82.6 - 5 2016-17 79.3 82.6 - 6 2017-18 88.8 82.6 - 6 2016-17 83.7 82.6 - 6 2016-17 88.1 82.6 - 7 2016-17 88.1 - - 6 2017-18 97.9 88.1 - 7 2016-17 98.4 88.1 - 7 2016-17 99.5 88.1 - 7 2016-17 99.5 88.1 - 8 2017-18 99.5	1				-		
22017-1890.382.6-32016-1787.582.6-2017-1891.182.6-42016-1779.382.63.32017-1888.882.6-52016-1783.782.6-2016-1783.782.6-62017-1878.182.6-72016-178882.6-62017-1881.282.6-72016-178882.6-62017-1881.282.6-72016-1799.588.1-62017-1897.988.1-72016-1798.488.1-72016-1799.588.1-72016-1799.588.1-92016-1799.688.1-2017-1899.588.1-92016-1799.688.1-92016-1799.688.1-92016-1799.688.1-998.882.692016-1791.382.6-92016-1781.582.6-92016-1781.582.6-12017-1890.982.6-2017-1890.982.6-2016-1787.582.6-2016-1787.582.6<	±	2017-18			-		
2017-18 90.3 82.6 - 3 2016-17 87.5 82.6 - 4 2017-18 91.1 82.6 - 4 2016-17 79.3 82.6 3.3 5 2016-17 83.7 82.6 - 5 2016-17 83.7 82.6 - 6 2017-18 88.8 82.6 - 6 2016-17 83.7 82.6 4.5 6 2017-18 81.2 82.6 1.4 6 2016-17 88 82.6 - 6 2016-17 99.5 88.1 - 7 2016-17 99.5 88.1 - 7 2016-17 99.5 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 8 201	2	2016-17	87.4	82.6	-		
32017-1891.182.6-42016-1779.382.63.32017-1888.882.6-52016-1783.782.6-2016-1783.782.6-62017-1878.182.6-762016-178882.6-762016-178882.6-712016-1788.182.6-62017-1897.988.1-72016-1799.588.1-62017-1897.988.1-72016-1799.588.1-72016-1799.588.1-72016-1799.588.1-72016-1799.788.1-82016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.688.1-92016-1799.688.1-92016-1799.688.1-92016-1781.620.6-102017-18082.6-112016-178.582.674.1122016-178.582.6-132016-178.582.6-142017-18082.6-152016-178.582.6- <td>۷</td> <td>2017-18</td> <td>90.3</td> <td>82.6</td> <td>-</td>	۷	2017-18	90.3	82.6	-		
2017-1891.182.6-2016-1779.382.63.32017-1888.882.6-2016-1783.782.6-2017-1878.182.64.52017-1878.182.64.52017-1878.182.64.52017-1878.182.64.562017-1881.282.64.572016-178882.61.462017-1899.588.1-72016-1799.588.1-62017-1899.788.1-72016-1799.788.1-72016-1799.788.1-72016-1799.788.1-72016-1799.788.1-92016-1799.788.1-92016-1799.788.1-92016-1799.588.1-92016-1799.788.1-92016-1799.688.1-92016-1799.688.1-92016-1781.626.61091.382.674.1981.62017.1890.98282.674.1982.66.26982.674.1982.674.1982.674.1982.674.1982.	2	2016-17	87.5	82.6	-		
42017-1888.882.6-2016-1783.782.6-2017-1878.182.64.562017-1881.282.6-2016-178882.6-2017-1881.282.61.4GTPS Faisebal2016-1799.588.1-32016-1799.588.1-62017-1897.988.1-72016-1798.488.1-62017-1894.888.1-72016-1799.588.1-72016-1799.588.1-82016-1799.588.1-92016-1799.588.1-92016-1799.588.1-92016-1799.688.1-92016-1799.688.1-92016-1799.688.1-12016-1799.688.1-12016-1799.882.6-2016-1789.882.674.112017-18082.6-22016-1787.582.6-22016-1787.582.6-22016-1780.982.6-22016-1780.982.6-22016-1787.582.6-22016-1780.982.6- <t< td=""><td>5</td><td>2017-18</td><td>91.1</td><td>82.6</td><td>-</td></t<>	5	2017-18	91.1	82.6	-		
2017-1888.882.6-2016-1783.782.6-2017-1878.182.64.52017-1878.182.64.52016-178882.6-2017-1881.282.61.4GTPS Faiser52016-1799.588.1-62017-1897.988.1-72016-1798.488.1-2016-1799.788.1-72016-1799.788.1-72016-1799.788.1-82016-1799.788.1-92016-1799.788.1-92016-1799.788.1-92016-1799.788.1-92016-1799.588.1-92016-1799.588.1-92016-1799.882.6-92016-1799.882.6-92016-1785.582.674.1990.982.612016-1787.582.6-22016-1787.582.6-12016-1787.582.6-22016-1787.582.6-102017-1890.982.6-22016-1787.582.6-102017-1890.982.6-<	л	2016-17	79.3	82.6	3.3		
52017-1878.182.64.562016-178882.6-2017-1881.282.61.4GTPS Faisebad52016-1799.588.1-2017-1897.988.1-62017-1897.988.1-72016-1798.488.1-2017-1894.888.172016-1799.788.1-2017-1899.788.172016-1799.788.1-82016-1799.788.1-92016-1799.788.1-2017-1899.588.192016-1799.688.1-2017-1898.882.62017-1898.882.692016-1781.582.6-2017-1890.982.62017-1890.982.62017-1890.982.62017-1890.982.62016-1787.582.62016-1787.582.62017-1890.982.62017-1890.982.62017-1890.982.62016-1787.582.62016-178	4	2017-18	88.8	82.6	-		
2017-18 78.1 82.6 4.5 6 2016-17 88 82.6 - 2017-18 81.2 82.6 1.4 GTPS Faisebad - 99.5 88.1 - 5 2016-17 99.5 88.1 - 6 2017-18 97.9 88.1 - 6 2016-17 98.4 88.1 - 6 2017-18 94.8 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 8 90.7 88.1 - - 8 91.3 88.1 - - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 2017-18 0 82.6<	F	2016-17	83.7	82.6	-		
6 2017-18 81.2 82.6 1.4 GTPS Faisabad 3 2016-17 99.5 88.1 - 5 2017-18 97.9 88.1 - 6 2017-18 97.9 88.1 - 6 2016-17 98.4 88.1 - 7 2016-17 98.4 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 8 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 9 98.8 82.6 - - 9 90.9 82.6 - - 2016-17 87.5 82.6 -	5	2017-18	78.1	82.6	4.5		
2017-18 81.2 82.6 1.4 GTPS Faisabad -<	c	2016-17	88	82.6	-		
2 2016-17 99.5 88.1 - 2017-18 97.9 88.1 - 6 2016-17 98.4 88.1 - 7 2016-17 98.4 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 2017-18 99.5 88.1 - 2017-18 99.5 88.1 - 8 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 2017-18 98.7 88.1 - 9 2016-17 91.3 82.6 - 5PS Faisa-bad 2017-18 98.8 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6<	O	2017-18	81.2	82.6	1.4		
5 2017-18 97.9 88.1 - 6 2016-17 98.4 88.1 - 2017-18 94.8 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 7 2016-17 99.7 88.1 - 8 2016-17 99.5 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 2017-18 98.8 82.6 - - 1 2016-17 8.5 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2017-18<	GTPS Fais	alabad					
2017-18 97.9 88.1 - 6 2016-17 98.4 88.1 - 7 2017-18 94.8 88.1 - 7 2016-17 99.7 88.1 - 2017-18 99.7 88.1 - 7 2016-17 99.7 88.1 - 8 2016-17 99.5 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 5PS Faisa-bd 5 82.6 74.1 1 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2017-18 90.9	F	2016-17	99.5	88.1	-		
6 2017-18 94.8 88.1 - 7 2016-17 99.7 88.1 - 2017-18 99.5 88.1 - 8 2016-17 99.6 88.1 - 8 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 5PS Faisa 98.8 82.6 - - 1 2016-17 8.5 82.6 74.1 20 16.17 87.5 82.6 - 20 2016-17 87.5 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6	5	2017-18	97.9	88.1	-		
2017-18 94.8 88.1 - γ 2016-17 99.7 88.1 - 2017 -18 99.5 88.1 - 2017 -18 99.5 88.1 - 8 2016-17 99.6 88.1 - 8 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 99.6 88.1 - 9 2016-17 91.3 82.6 - 2017 -18 98.8 82.6 - 2017 -18 98.8 82.6 - SPS Faisata - - - - 2016 -17 8.5 82.6 74.1 2016 787.5 82.6 - 2016 90.9 82.6 - 2017 -18 90.9 82.6 - 2017 -18 90.9 82.6 - 2017 -18 90.9 <	C	2016-17	98.4	88.1	-		
7 2017-18 99.5 88.1 - 8 2016-17 99.6 88.1 - 8 2016-17 99.6 88.1 - 9 2017-18 98.7 88.1 - 9 2016-17 91.3 82.6 - 2017-18 98.8 82.6 - 2017-18 98.8 82.6 - SPS Faisabab 5 82.6 74.1 2016-17 8.5 82.6 74.1 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2017-18 90.9 82.6 - 2 2017-18 90.9 82.6 - 3 90.9 82.6 - -	б	2017-18	94.8	88.1	-		
2017-18 99.5 88.1 - 8 2016-17 99.6 88.1 - 2017-18 98.7 88.1 - 9 2016-17 91.3 82.6 - 9 2016-17 91.3 82.6 - 2017-18 98.8 82.6 - SPS Faisabad Second Second - 2016-17 8.5 82.6 74.1 2017-18 0 82.6 6 2016-17 8.5 82.6 74.1 2016-17 87.5 82.6 - 2016-17 87.5 82.6 - 2016-17 87.5 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6 - 2017-18 90.9 82.6 - 2016-17 54.7<	7	2016-17	99.7	88.1	-		
8 2017-18 98.7 88.1 - 9 2016-17 91.3 82.6 - 2017-18 98.8 82.6 - 2017-18 98.8 82.6 - SPS Faisabad 2016-17 8.5 82.6 74.1 2016-17 8.5 82.6 74.1 2016-17 8.5 82.6 74.1 2016-17 8.5 82.6 74.1 2016-17 87.5 82.6 - 2016-17 87.5 82.6 - 2016-17 87.5 82.6 - 2017-18 90.9 82.6 - CCPP Nameur 2016-17 54.7 81.6 26.9	/	2017-18	99.5	88.1	-		
2017-18 98.7 88.1 - 9 2016-17 91.3 82.6 - 2017-18 98.8 82.6 - SPS Faisabad 2016-17 8.5 82.6 74.1 2017-18 0 82.6 74.1 2017-18 0 82.6 6 2 2016-17 8.5 82.6 74.1 20 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - 2 2017-18 90.9 82.6 - CCPP Name T 2 2016-17 54.7 81.6 26.9	0	2016-17	99.6	88.1	-		
9 2017-18 98.8 82.6 - SPS Faisalbad 1 2016-17 8.5 82.6 74.1 2017-18 0 82.6 82.6 6 2 2016-17 8.5 82.6 6 6 2 2016-17 87.5 82.6 - 6 2 2017-18 90.9 82.6 - 6 7 2 2017-18 90.9 82.6 - 7	ð	2017-18	98.7	88.1	-		
2017-18 98.8 82.6 - SPS Faisalad 2016-17 8.5 82.6 74.1 2017-18 0 82.6 82.6 6 2 2016-17 8.5 82.6 6 6 2 2016-17 87.5 82.6 - 2 2016-17 87.5 82.6 - CCPP Name 90.9 82.6 - 2 017-18 90.9 82.6 - 2 017-18 90.9 82.6 - CCPP Name 90.9 82.6 - 1 2016-17 54.7 81.6 26.9	0	2016-17	91.3	82.6	-		
2016-17 8.5 82.6 74.1 2017-18 0 82.6 82.6 2 2016-17 87.5 82.6 - 2017-18 90.9 82.6 - CCPP Name 54.7 81.6 26.9	9	2017-18	98.8	82.6	-		
1 2017-18 0 82.6 82.6 2 2016-17 87.5 82.6 - 2 2017-18 90.9 82.6 - CCPP Nambipur 2016-17 54.7 81.6 26.9	SPS Faisa	labad					
2017-18 0 82.6 82.6 2 2016-17 87.5 82.6 - 2017-18 90.9 82.6 - CCPP Nambigur 2016-17 54.7 81.6 26.9		2016-17	8.5	82.6	74.1		
2 2017-18 90.9 82.6 - CCPP Nandipur 2 2016-17 54.7 81.6 26.9	1	2017-18	0	82.6	82.6		
2017-18 90.9 82.6 - CCPP Nandipur 2016-17 54.7 81.6 26.9	2	2016-17	87.5	82.6	-		
1 2016-17 54.7 81.6 26.9	2	2017-18	90.9	82.6	-		
1 2016-17 54.7 81.6 26.9	CCPP Nar	ndipur					
1 2017-18 93.3 81.6 -		-	54.7	81.6	26.9		
	1		93.3		-		

Table 14.3 (GENCO III)

3.5 Net Capacity Factor:

According to Performance Standards (Generation) Rules 2009,

 $Net \ Capacity \ Factor = \frac{Net \ Generation}{Net \ Capacity \ * \ Period \ Hours}$

The Net Capacity Factor (%) of different power stations of public sector GENCOs, during the FY 2016-17 and 2017-18, remained as follows;

		Table 15	
S No.	Dowor Station	Net Capacit	ty Factor (%)
S.No.	Power Station	2016-17	2017-18
GENCC)		
1	TPS Jamshoro	57	32
2	GTPS Kotri	37	10
GENCO)		
3	TPS Guddu	28	34
4	Guddu 747	67	59
GENCO)		
5	TPS Muzaffargarh	53	29
6	GTPS Faisalabad	11	6
7	SPS Faisalabad	15	1
8	CCPP Nandipur	40	61
GENCO) IV		
9	Lakhra PS	16	2

Unit wise details are attached at Annex IV





3.6 Net Output Factor:

According to Performance Standards (Generation) Rules 2009,

 $Net \ Output \ Factor = \frac{Net \ Generation}{Net \ Capacity * Service \ Hours}$

The Net Output Factor (%) of different power stations of public sector GENCOs, during the FY 2016-17 and 2017-18, remained as follows;

		Table 16	
S.No.	Power Station	Net Outpu	t Factor (%)
5.INO.	Power Station	2016-17	2017-18
GENCO)		
1	TPS Jamshoro	80	71
2	GTPS Kotri	83	76
GENCC)		
3	TPS Guddu	75	65
4	Guddu 747	78	79
GENCC)		
5	TPS Muzaffargarh	76	68
6	GTPS Faisalabad	82	84
7	SPS Faisalabad	85	87
8	CCPP Nandipur	74	73
GENCO) IV		
9	Lakhra PS	66	54
	Linit wice details ar		

Unit wise details are attached at Annex IV



Figure 12

3.7 Energy Availability Factor:

According to Performance Standards (Generation) Rules 2009;

$$Energy Availability Factor = \frac{Available Hour - EPDH - EUDH}{Period Hours}$$

Where;

EPDH = Equivalent Planned Derated Hours EUDH = Equivalent Unplanned Derated Hours

The Energy Availability Factor (%) of different power stations of public sector GENCOs, during the FY 2016-17 and 2017-18, remained as follows;

Table 17											
S.No.	Power Station	Energy Availa	oility Factor (%)								
5.10.	Power Station	2016-17	2017-18								
GENCO)										
1	TPS Jamshoro	58	64								
2	GTPS Kotri	94	93								
GENCO)										
3	TPS Guddu	57	58								
4	Guddu 747	87	75								
GENCO) III										
5	TPS Muzaffargarh	62	62								
6	GTPS Faisalabad	95	97								
7	SPS Faisalabad	47	45								
8	CCPP Nandipur	45	56								
GENCO) IV										
9	Lakhra PS	24	5								
	Linit wise details	are attached at An	nev IV								

Unit wise details are attached at Annex IV





Annex I Page 1 of 4

	ENERG	LOSS AND	SUBSEQUE	NT FINANCIA	L IMPACT DU	JE TO REDU	ICTION IN NET CA	PACITY (GEN	CO I)
			TPS	S JAMSHOR	O (1*250 + 3	3*200 = 85	0 MW)		
			Capaci	ty (MW)		Service	Energy Loss	Unit Rate	Financial Impact
Unit	Year			Net		Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		Installed	Actual	Approved	Reduction		. ,	, , ,	· · ·
	2046.47		1	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
1	2016-17 2017-18	250	181.70	182.45	0.75	6336	4.752 7.646	9.7 11.2	0.046
			180.36		2.09	3658			
2	2016-17 2017-18	200	154.16	154.73	0.57	5141	2.930 1.551	10.1 10.4	0.030 0.016
			154.21		0.52	2983		-	
3	2016-17	200	154.16	155.36	1.2	6174	7.408	9.1	0.067
	2017-18		154.38		0.98	3853	3.776	10.1	0.038
4	2016-17	200	153.54	156.48	2.94	7464	21.946	9	0.198
	2017-18		153.29		3.19	5098	16.261	9.5	0.154
Overall	2016-17	850		649.02			37.036		0.341
	2017-18			0.000			29.235		0.294
			TOTAL				66.270		0.635
				GTPS KOTR	I (4*25 + 1*	44 = 144 N	1W)		
			Capaci	ty (MW)		Service	Energy Loss	Unit Rate	Financial Impact
Unit	Year			Net		Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
01110	rear	Installed	Actual	Approved	Reduction	nours	. ,		· · ·
			1	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
3	2016-17	25	21.98	18	0	4615	0	7.7	0
-	2017-18		21.97		0	1162	0	4.4	0
4	2016-17	25	21.98	18	0	4268	0	7.7	0
	2017-18	23	21.98	10	0	1257	0	4.4	0
5	2016-17	25	21.79	18	0	3029	0	7.7	0
ſ	2017-18	25	21.76	10	0	789	0	4.4	0
6	2016-17	25	21.77	18	0	3666	0	7.7	0
0	2017-18	25	21.76	10	0	1358	0	4.4	0
7	2016-17	44	38.28	35	0	3971	0	7.7	0
/	2017-18	44	35.09	30	0	1338	0	4.4	0
Overall	2016-17	144		107			0		0
Overall	2017-18	144		107			0		0
			TOTAL				0		0

NOTE

Annex I Page 2 of 4

	ENERGY	LOSS AND	SUBSEQUEN	T FINANCIAL	IMPACT DU	E TO REDU	CTION IN NET CA	PACITY (GEN	CO II)
	1	TPS			0 + 6*100 +	2*136 + 1	*143 = 1600 M	W)	
			Capaci	ty (MW)			T		
Unit	Year			Net		Service	Energy Loss	Unit Rate	Financial Impact
		Installed	Actual	Approved	Reduction	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
			1	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
1	2016-17	110	85	70	0	0	0	0	0
	2017-18		85		0	0	0	0	0
2	2016-17	110	85	70	0	0	0	0	0
	2017-18	-	85	-	0	0	0	0	0
3	2016-17	210	168.77	170	1.23	1976	2.430	8.2	0.020
0	2017-18		165.22	270	4.78	2177	10.408	5.8	0.060
4	2016-17	210	180	170	0	0	0	0	0
7	2017-18	210	180	170	0	0	0	0	0
5	2016-17	100	80.19	85	4.81	6752	32.477	8	0.260
J	2017-18	100	81.49	65	3.51	8311	29.173	6.8	0.198
6	2016-17	100	80.42	85	4.58	4823	22.089	8	0.177
0	2017-18	100	81.69	65	3.31	8059	26.677	6.8	0.181
7	2016-17	100	94.35	90	0	5412	0	8	0
7	2017-18	100	93.98	90	0	8232	0	6.8	0
	2016-17	100	94.29		0	5924	0	8	0
8	2017-18	100	94.11	90	0	6790	0	6.8	0
_	2016-17		94.10		0	3877	0	8	0
9	2017-18	100	94.02	90	0	8018	0	6.8	0
	2016-17		94.07		0	5082	0	8	0
10	2017-18	100	93.96	90	0	7410	0	6.8	0
	2016-17		129.73		0.27	4730	1.277	6.4	0.008
11	2017-18	136	129.61	130	0.39	3316	1.293	5.2	0.007
	2016-17		129.55		0.45	4535	2.041	6.4	0.013
12	2017-18	136	129.4	130	0.6	7639	4.583	5.2	0.024
	2016-17		140		0.0	0	0	6.4	0.024
13	2017-18	143	140	130	0	0	0	5.2	0
	2016-17		140		0	Ū	60.315		0.478
Overall	2017-18	1655		1400			72.134		0.471
			TOTAL				132.449		0.948
			-	747 CCDD /	3*355 6 . 1	*265 5 - 7			0.540
				-	2*255.6 + 1	205.5 = /	70.7 10100)		
			Capaci	ty (MW)		C	F	11.11.2	Plana and all a
Unit	Year	Installad		Net		Service	Energy Loss	Unit Rate	Financial Impact
		Installed	Actual	Approved	Reduction	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
	2016 17		242	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
14	2016-17 2017-18	255.6	243	241.72	0	7563	0	4.3	0
			243		0	7041	-		-
15	2016-17 2017-18	255.6	233.5	241.72	8.22	7677	63.105	4.3	0.271
			243		0	7219	0		
16	2016-17 2017-18	265.5	261	237.35	0	7705	0	4.3	0
			261		0	5419	0	4.2	-
Overall	2016-17 2017-18	776.7		720.79			63.105		0.271
	2017-18		TOTAL				0		0
			TOTAL				63.105		0.271

NOTE

Annex I Page 3 of 4

							TION IN NET CAP	PACITY (GENO	CO III)
		1			*210 + 1*32	0 + 2*200	= 1350 MW)		
			Capaci	ty (MW)					
Unit	Year	Installed	Actual	Net Approved	Reduction	Service Hours	Energy Loss (Million kWh)	Unit Rate (Rs/kWh)*	Financial Impact (Rs. Billion)
			1	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
	2016-17	24.0	183.86	400	6.14	6919.5	42.486	10.5	0.446
1	2017-18	210	183.52	190	6.48	4194.3	27.179	12.6	0.342
	2016-17		184.72		0	6735.0	0	10.5	0
2	2017-18	210	183.84	182.5	0	4185.8	0	12.6	0
	2016-17		186.24		0	6436.3	0	10.5	0
3	2010-17	210		183.5		4379.4	0	10.5	0
			186.28		0		-		-
4	2016-17	320	266.37	272.2	5.83	6085.1	35.476	10.5	0.372
	2017-18		266.7		5.5	4124.9	22.687	12.6	0.286
5	2016-17	200	180.24	181.44	1.2	5528.2	6.634	10.5	0.070
3	2017-18	200	181.58	101.44	0	2661.7	0.000	12.6	0
c	2016-17	200	177.84	172.00	0	5405.0	0	10.5	0
6	2017-18	200	179.02	173.88	0	2852.2	0	12.6	0
	2016-17						84.596		0.888
Overall	2017-18	1350		1183.52			49.866		0.628
	1017 10		TOTAL				134.462		1.517
			TOTAL						1.517
			GT	PS Faisalab	ad (4*25 + 1	*44 = 144	MW)		
			Capaci	ty (MW)					
				Net		Service	Energy Loss	Unit Rate	Financial Impact
Unit	Year	Installed	Actual	Approved	Reduction	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		motanea	Actual 1			4	5 = 3*4	,	7 = 5*6
	2016 17		_	2	3 = 2-1			6	
5	2016-17	25	22.86	20	0	2135.8	0	6.4	0
	2017-18		22.83		0	1187.1	0	12.8	0
6	2016-17	25	22.87	20	0	1949.0	0	6.4	0
	2017-18	25	22.86	20	0	974.6	0	12.8	0
	2016-17		22.86		0	2109.9	0	6.4	0
7	2017-18	25	22.83	20	0	1267.6	0	12.8	0
					-		-	-	-
8	2016-17	25	22.87	20	0	2145.5	0	6.4	0
	2017-18		22.89		0	922.4	0	12.8	0
9	2016-17	44	36.53	37	0.5	2121.2	0.997	6.4	0.006
3	2017-18	44	37.02	37	0	1247.3	0	12.8	0
	2016-17						0.997		0.006
Overall	2017-18	144		117			0		0
			TOTAL				0.997		0.006
			TOTAL						0.000
				SPS Faisal	abad (2*66	= 132 MW	/)		
			Capaci	ty (MW)					
	ν.			Net		Service		Unit Rate	Financial Impact
	Year					Service	Energy Loss	Unit Nate	
Unit	rear	Installed	Actual		Reduction	Hours			(Rs. Billion)
Unit	Tear	Installed	Actual	Approved	Reduction	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion) 7 = 5*6
Unit		Installed	1		3 = 2-1	Hours 4	(Million kWh) 5 = 3*4	(Rs/kWh)* 6	7 = 5*6
Unit 1	2016-17	Installed	1 50		3 = 2-1 0	Hours 4 0	(Million kWh) 5 = 3*4 0	(Rs/kWh)* 6 0	7 = 5*6 0
	2016-17 2017-18		1 50 50	Approved 2	3 = 2-1 0 0	Hours 4 0 0	(Million kWh) 5 = 3*4 0 0	(Rs/kWh)* 6 0 0	7 = 5*6 0 0
	2016-17 2017-18 2016-17		1 50 50 43.95	Approved 2	3 = 2-1 0 0 4.55	Hours 4 0 0 3024.1	(Million kWh) 5 = 3*4 0 0 13.760	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0 0.151
1	2016-17 2017-18 2016-17 2017-18	66	1 50 50	Approved 2 48.5	3 = 2-1 0 0	Hours 4 0 0	(Million kWh) 5 = 3*4 0 0 13.760 0.934	(Rs/kWh)* 6 0 0	7 = 5*6 0 0 0.151 0.007
1 2	2016-17 2017-18 2016-17	66 66	1 50 50 43.95	Approved 2 48.5 48.5	3 = 2-1 0 0 4.55	Hours 4 0 0 3024.1	(Million kWh) 5 = 3*4 0 0 13.760	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0 0.151
1	2016-17 2017-18 2016-17 2017-18	66	1 50 50 43.95	Approved 2 48.5	3 = 2-1 0 0 4.55	Hours 4 0 0 3024.1	(Million kWh) 5 = 3*4 0 0 13.760 0.934	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0 0.151 0.007
1 2	2016-17 2017-18 2016-17 2017-18 2016-17	66 66	1 50 50 43.95 43.50	Approved 2 48.5 48.5	3 = 2-1 0 0 4.55	Hours 4 0 0 3024.1	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0 0.151 0.007 0.151 0.007
1 2	2016-17 2017-18 2016-17 2017-18 2016-17	66 66	1 50 50 43.95	Approved 2 48.5 48.5 97	3 = 2-1 0 4.55 5	Hours 4 0 3024.1 186.8	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0.151 0.007 0.151
1 2	2016-17 2017-18 2016-17 2017-18 2016-17	66 66 132	1 50 43.95 43.50 TOTAL	Approved 2 48.5 48.5 97 CCPP N	3 = 2-1 0 0 4.55	Hours 4 0 3024.1 186.8	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0 0.151 0.007 0.151 0.007
1 2	2016-17 2017-18 2016-17 2017-18 2016-17	66 66 132	1 50 50 43.95 43.50	Approved 2 48.5 48.5 97 CCPP N	3 = 2-1 0 4.55 5	Hours 4 0 3024.1 186.8 25 MW)	(Million kWh) 5 = 3*4 0 13.760 0.934 13.760 0.934 14.694	(Rs/kWh)* 6 0 11 7.7	7 = 5*6 0 0.151 0.007 0.151 0.007 0.151 0.007 0.159
1 2 Overall	2016-17 2017-18 2016-17 2017-18 2016-17 2017-18	66 66 132	1 50 43.95 43.50 TOTAL	Approved 2 48.5 48.5 97 CCPP N	3 = 2-1 0 4.55 5	Hours 4 0 3024.1 186.8	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934	(Rs/kWh)* 6 0 0 11	7 = 5*6 0 0.151 0.007 0.151 0.007 0.151 0.007 0.159
1 2	2016-17 2017-18 2016-17 2017-18 2016-17	66 66 132	1 50 50 43.95 43.50 TOTAL	Approved 2 48.5 48.5 97 CCPP N W) Net	3 = 2-1 0 4.55 5	Hours 4 0 3024.1 186.8 25 MW)	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934 14.694 Energy Loss	(Rs/kWh)* 6 0 11 7.7	7 = 5*6 0 0.151 0.007 0.151 0.007 0.151 0.007 0.159
1 2 Overall	2016-17 2017-18 2016-17 2017-18 2016-17 2017-18	66 66 132	1 50 43.95 43.50 TOTAL Capacity (M\ Actual	Approved 2 48.5 48.5 97 CCPP N	3 = 2-1 0 4.55 5 Nandipur (42 Reduction	Hours 4 0 3024.1 186.8 25 MW) Service Hours	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934 14.694 Energy Loss (Million kWh)	(Rs/kWh)* 6 0 11 7.7 Unit Rate (Rs/kWh)*	7 = 5*6 0 0.151 0.007 0.151 0.007 0.159 Financial Impact (Rs. Billion)
1 2 Overall Unit	2016-17 2017-18 2016-17 2017-18 2016-17 2017-18 Year	66 66 132 Installed	1 50 43.95 43.50 TOTAL Capacity (MV Actual 1	Approved 2 48.5 48.5 97 CCPP N W) Net Approved 2	3 = 2-1 0 4.55 5 Nandipur (42 Reduction 3 = 2-1	Hours 4 0 3024.1 186.8 25 MW) Service Hours 4	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934 14.694 Energy Loss (Million kWh) 5 = 3*4	(Rs/kWh)* 6 0 11 7.7 Unit Rate (Rs/kWh)* 6	7 = 5*6 0 0 0.151 0.007 0.151 0.007 0.159 Financial Impact (Rs. Billion) 7 = 5*6
1 2 Overall	2016-17 2017-18 2016-17 2017-18 2016-17 2017-18 Year 2016-17	66 66 132	1 50 50 43.95 43.50 TOTAL Capacity (MV Actual 1 401.83	Approved 2 48.5 48.5 97 CCPP N No Net Approved	3 = 2-1 0 4.55 5 Nandipur (42 Reduction 3 = 2-1 9.51	Hours 4 0 0 3024.1 186.8 25 MW) Service Hours 4 4718.3	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934 14.694 Energy Loss (Million kWh) 5 = 3*4 44.871	(Rs/kWh)* 6 0 11 7.7 Unit Rate (Rs/kWh)* 6 8	7 = 5*6 0 0.151 0.007 0.151 0.007 0.159 Financial Impact (Rs. Billion) 7 = 5*6 0.359
1 2 Overall Unit	2016-17 2017-18 2016-17 2017-18 2016-17 2017-18 Year	66 66 132 Installed	1 50 43.95 43.50 TOTAL Capacity (MV Actual 1	Approved 2 48.5 48.5 97 CCPP N W) Net Approved 2	3 = 2-1 0 4.55 5 Nandipur (42 Reduction 3 = 2-1	Hours 4 0 3024.1 186.8 25 MW) Service Hours 4	(Million kWh) 5 = 3*4 0 0 13.760 0.934 13.760 0.934 14.694 Energy Loss (Million kWh) 5 = 3*4	(Rs/kWh)* 6 0 11 7.7 Unit Rate (Rs/kWh)* 6	7 = 5*6 0 0 0.151 0.007 0.151 0.007 0.159 Financial Impact (Rs. Billion) 7 = 5*6

NOTE

Annex I Page 4 of 4

			L	akhra Powe	r Station (3*	*50 = 150 I	NW)		
			Capac	ity (MW)					
Unit	Year			Net		Service	Energy Loss	Unit Rate	Financial Impact
onit	rear	Installed	Actual	Approved	Reduction	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
			1	2	3 = 2-1	4	5 = 3*4	6	7 = 5*6
1	2016-17	50	28.4	31.2	2.8	284.5	0.797	4	0.003
I	2017-18	50	25.52	51.2	5.68	59.18	0.336	4.8	0.002
2	2016-17	50	28.4	4 21.2	2.8	3986.0	11.161	4	0.045
2	2017-18	50	25.52	31.2	5.68	142.05	0.807	4.8	0.004
3	2016-17	50		31.2					
3	2017-18	50	-	31.2		r	EQUIRES REHAB	ILITATION	
0	2016-17	450		02.6			11.957		0.048
Overall	2017-18	150		93.6			1.143		0.005
			TOTAL				13.100		0.053

NOTE

Annex II Page 1 of 3

			UN	USED ENER	JT PUIENI	IAL AND SUBS	TPS JAM		I DUE IO H	IGHER OUT	AGES (GENCO	וו		
Units	Year	Net Capacity as per Tariff (MW)	Period Hours (PH)	Planned Outage Hours (POH)	% of POH w.r.t PH	UnPlanned Outage Hours (UOH)	% of UOH w.r.t PH	Total Outage Hours w.r.t PH (%)	Allowed Limit as Per PPA (%)	Violation of Allowed Limit by (%)	Extra Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy Cos (Rs.Billion)
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*14
1	2016-17	182.45	8760	1013.05	11.6%	608.97	7.0%	18.5%	28.9%	0%	0	0	9.7	0
1	2017-18	182.45	8760	1148.32	13.1%	22.87	0.3%	13.4%	28.9%	0%	0	0	11.2	0
2	2016-17	154.73	8760	2184.42	24.9%	877.57	10.0%	35.0%	33.8%	1.2%	102	15.781	10.1	0.159
2	2017-18	154.73	8760	1185.12	13.5%	132.84	1.5%	15.0%	26.9%	0%	0	0	10.4	0
2	2016-17	155.36	8760	939.27	10.7%	317.50	3.6%	14.3%	26.9%	0%	0	0	9.1	0
3	2017-18	155.36	8760	472.65	5.4%	451.63	5.2%	10.6%	26.9%	0%	0	0	10.1	0
	2016-17	156.48	8760	88.58	1.0%	197.05	2.2%	3.3%	26.9%	0%	0	0	9	0
4	2017-18	156.48	8760	1216.33	13.9%	527.74	6.0%	19.9%	26.9%	0%	0	0	9.5	0
Overall	2016-17	649.02										15.781		0.159
Overall	2017-18	649.02										0		0
						Fotal						15.781		0.159
							GTPS I	OTRI						
Units	Year	Net Capacity as per Tariff (MW)	Period Hours (PH)	Planned Outage Hours (POH)	% of POH w.r.t PH	UnPlanned Outage Hours (UOH)	% of UOH w.r.t PH	Total Outage Hours w.r.t PH (%)	Allowed Limit as Per PPA (%)	Violation of Allowed Limit by (%)	Extra Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy Cos (Rs.Billion)
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*14
	2016-17	18	8760	0	0%	46.6	0.5%	0.5%	17.4%	0%	0	0	7.7	0
3	2017-18	18	8760	0	0%	1785.2	20.4%	20.4%	17.4%	3.0%	261	4.697	4.4	0.021
	2016-17	18	8760	0	0%	20.4	0.2%	0.2%	17.4%	0%	0	0	7.7	0
4	2017-18	18	8760	0	0%	482.0	5.5%	5.5%	17.4%	0%	0	0	4.4	0
	2016-17	18	8760	0	0%	1605.8	18.3%	18.3%	17.4%	0.9%	82	1.468	7.7	0.011
5	2017-18	18	8760	480	5.5%	157.4	1.8%	7.3%	17.4%	0%	0	0	4.4	0
	2016-17	18	8760	0	0%	320.5	3.7%	3.7%	17.4%	0%	0	0	7.7	0
6	2017-18	18	8760	4	0.05%	10.9	0.1%	0.2%	17.4%	0%	0	0	4.4	0
	2016-17	35	8760	0	0%	701.6	8.0%	8.0%	17.4%	0%	0	0	7.7	0
7	2017-18	35	8760	0	0%	327.0	3.7%	3.7%	17.4%	0%	0	0	4.4	0
Overall	2016-17 2017-18	107										1.468 4.697		0.011
						Total						6.165		0.032
												0.105		0.032
OTE														
U.L		achine has												

t

Annex II Page 2 of 3

						TIAL AND SUB						II)		Page 2
			UN	NUSED ENER	GY PUTEN	TIAL AND SUB		UDDU	I DUE IU H	IGHER OUT	AGES (GENCO	11)		
Units	Year	Net Capacity as per Tariff (MW)	Period Hours (PH)	Planned Outage Hours (POH)	% of POH w.r.t PH	UnPlanned Outage Hours (UOH)	% of UOH w.r.t PH	Total Outage Hours w.r.t PH (%)	Allowed Limit as Per PPA (%)	Violation of Allowed Limit by (%)	Extra Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy C (Rs.Billic
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*1
	2016-17	70	8760	0	0%	8760	100%	100%	17.4%	82.6%	7240	506.800	8.2	4.156
1	2017-18	70	8760	0	0%	8760	100%	100%	17.4%	82.7%	7240	506.810	5.8	2.939
2	2016-17	70	8760	0	0%	8760	100%	100%	17.4%	82.6%	7240	506.800	8.2	4.15
2	2017-18	70	8760	0	0%	8760	100%	100%	17.4%	82.7%	7240	506.810	5.8	2.93
2	2016-17	170	8760	0	0%	1212	13.8%	13.8%	17.4%	0%	0	0	8.2	0.00
3	2017-18	170	8760	0	0%	106	1.2%	1.2%	17.4%	0%	0	0	5.8	0.00
	2016-17	170	8760	0	0%	8760	100%	100%	17.4%	82.6%	7240	1230.800	8.2	10.09
4	2017-18	170	8760	0	0%	8760	100%	100%	17.4%	82.7%	7240	1230.824	5.8	7.13
_	2016-17	85	8760	0	0%	826	9.4%	9.4%	13.2%	0%	0	0	8	0.00
5	2017-18	85	8760	0	0%	449	5.1%	5.1%	13.2%	0%	0	0	6.8	0.00
	2016-17	85	8760	0	0%	1050	12.0%	12.0%	13.2%	0%	0	0	8	0.00
6	2017-18	85	8760	0	0%	701	8.0%	8.0%	13.2%	0%	0	0	6.8	0.00
_	2016-17	90	8760	2088.8	23.8%	86	1.0%	24.8%	17.4%	7.5%	655	58.932	8	0.47
7	2017-18	90	8760	0	0%	521	5.9%	5.9%	17.4%	0%	0	0	6.8	0.00
	2016-17	90	8760	1464	16.7%	354	4.0%	20.8%	17.4%	3.4%	298	26.820	8	0.21
8	2017-18	90	8760	0	0%	1392	15.9%	15.9%	17.4%	0%	0	0	6.8	0.00
	2016-17	90	8760	3672	41.9%	462	5.3%	47.2%	33.8%	13.4%	1174	105.660	8	0.84
9	2017-18	90	8760	0	0%	387	4.4%	4.4%	17.4%	0%	0	0	6.8	0.00
	2016-17	90	8760	1073	12.2%	269	3.1%	15.3%	17.4%	0%	0	0	8	0.00
10	2017-18	90	8760	0	0%	859	9.8%	9.8%	17.4%	0%	0	0	6.8	0.00
	2016-17	130	8760	0	0%	367	4.2%	4.2%	14.6%	0%	0	0	6.4	0.00
11	2017-18	130	8760	0	0%	4867	55.6%	55.6%	14.6%	40.9%	3587	466.334	5.2	2.42
	2016-17	130	8760	0	0%	124	1.4%	1.4%	14.6%	0%	0	0	6.4	0.00
12	2017-18	130	8760	0	0%	542	6.2%	6.2%	14.6%	0%	0	0	5.2	0.00
	2016-17	130	8760	0	0%	8760	100%	100%	16.0%	84%	7360	956.800	6.4	6.12
13	2017-18	130	8760	0	0%	8760	100%	100%	16.0%	84%	7360	956.820	5.2	4.97
	2016-17		0700	Ū	070	0700	10070	100/0	10.070	0470	7500	3392.612	5.2	26.0
Overall	2017-18	1400										3667.597		20.4
	1017 10					Total						7060.209		46.4
						Total	Gudd	u 747				7000.205		40.4
	1	Net		Planned	% of	UnPlanned	% of	Total	Allowed	Violation	Extra			
Units	Year	Capacity as per Tariff (MW)	Period Hours (PH)	Outage Hours (POH)	% of POH w.r.t PH	Outage Hours (UOH)	% of UOH w.r.t PH	Outage Hours w.r.t PH (%)	Limit as Per PPA (%)	of Allowed Limit by (%)	Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy (Rs.Bill
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13
	2016-17	241.72	8684	561.8	6.5%	559	6.4%	12.9%	17.4%	0%	0	0	4.3	0
14	2017-18	241.72	8760	329.66	3.8%	1390	15.9%	19.6%	17.4%	2.2%	195	47.152	4.2	0.19
45	2016-17	241.72	8844	585	6.6%	440	5.0%	11.6%	17.4%	0%	0	0	4.3	0
15	2017-18	241.72	8761	134.95	1.5%	1406	16.1%	17.6%	17.4%	0.2%	17	4.083	4.2	0.01
	2016-17	237.35	9047	739	8.2%	603	6.7%	14.8%	17.4%	0%	0	0	4.3	0.01
		237.35	8760	589.15	6.7%	2751	31.4%	38.1%	17.4%	20.7%	1816	431	4.2	1.81
16	2017-18													0
-												0		
16 Overall	2017-18 2016-17 2017-18	720.79										0 482.239		2.02

Annex II

			UN	USED ENERG	ST POTENT	IAL AND SUBS	EQUENT EN		DUE TO HI	GHER OUTA	GES (GENCO	111)		
Units	Year	Net Capacity as per Tariff (MW)	Period Hours (PH)	Planned Outage Hours (POH)	% of POH w.r.t PH	UnPlanned Outage Hours (UOH)	% of UOH w.r.t PH	Total Outage Hours w.r.t PH (%)	Allowed Limit as Per PPA (%)	Violation of Allowed Limit by (%)	Extra Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy Cos (Rs.Billion
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*14
1	2016-17	190	8760	698.4	8.0%	234.00	2.7%	10.6%	17.4%	0%	0	0	10.5	0
1	2017-18	190	8760	543.83	6.2%	301.18	3.4%	9.6%	17.4%	0%	0	0	12.6	0
2	2016-17	182.5	8760	765	8.7%	341.00	3.9%	12.6%	17.4%	0%	0	0	10.5	0
2	2017-18	182.5	8760	594	6.8%	254.03	2.9%	9.7%	17.4%	0%	0	0	12.6	0
3	2016-17	183.5	8760	590	6.7%	501.00	5.7%	12.5%	17.4%	0%	0	0	10.5	0
-	2017-18	183.5	8760	579.35	6.6%	198.87	2.3%	8.9%	17.4%	0%	0	0	12.6	0
4	2016-17	272.2	8760	720.3	8.2%	1091.00	12.5%	20.7%	17.4%	3.3%	291	79.292	10.5	0.833
	2017-18	272.2	8760	736.95	8.4%	242.01	2.8%	11.2%	17.4%	0%	0	0	12.6	0
5	2016-17	181.44	8760	707	8.1%	717.00	8.2%	16.3%	17.4%	0%	0	0	10.5	0
	2017-18	181.44	8760	744 645	8.5%	1171.89	13.4%	21.9%	17.4%	4.5% 0%	396 0	71.830	12.6	0.905 0
6	2016-17 2017-18	173.88 173.88	8760 8760	0	7.4%	405.00 1646.20	4.6% 18.8%	12.0% 18.8%	17.4% 17.4%	1.4%	126	0 21.944	10.5 12.6	0.276
	2017-18 2016-17	175.00	8700	0	0.0%	1040.20	10.070	10.0%	17.4%	1.470	120	79.292	12.0	0.278
Overall	2010-17	1183.52										93.774		1.182
	-01/-13					Total						173.066		2.014
							GTPS FA	SLABAD				1,01000		
		Net						Total		Violation				
Units	Year	Capacity as per Tariff	Period Hours (PH)	Planned Outage Hours (POH)	% of POH w.r.t PH	UnPlanned Outage Hours (UOH)	% of UOH w.r.t PH	Outage Hours w.r.t PH	Allowed Limit as Per PPA (%)	of Allowed Limit by	Extra Outage Hours Consumed	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	Energy Cos (Rs.Billion
		(MW)						(%)		(%)				
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*14
5	2016-17	20	8760	0	0%	45	0.5%	0.5%	11.9%	0%	0	0	6.4	0
	2017-18	20	8760	0	0%	181.75	2.1%	2.1%	11.9%	0%	0	0	12.8	0
6	2016-17	20	8760	0	0%	140	1.6%	1.6%	11.9%	0%	0	0	6.4	0
	2017-18	20	8760	0	0%	458.24	5.2%	5.2%	11.9%	0%	0	0	12.8	0
7	2016-17 2017-18	20 20	8760 8760	0	0% 0%	25 39.47	0.3%	0.3%	11.9% 11.9%	0%	0	0	6.4	0
	2017-18	20	8760	0	0%		0.5%	0.5%	11.9%	0% 0%	0	0	12.8 6.4	0
8	2016-17	20	8760	0	0%	35 110.83	1.3%	1.3%	11.9%	0%	0	0	12.8	0
	2017-18	37	8760	744	8.5%	20	0.2%	8.7%	17.4%	0%	0	0	6.4	0
9	2010-17	37	8760	0	0%	105.45	1.2%	1.2%	17.4%	0%	0	0	12.8	0
Overall	2016-17 2017-18	117										0		0
						Total						0		0
							SPS FAS	LABAD						
		Net		Planned	% of	UnPlanned	% of	Total	Allowed	Violation	Extra			
		Capacity	Period	Outage	POH	Outage	UOH	Outage	Limit as	of	Outage	Energy Loss	Unit Rate	Energy Cos
Units	Year	as per	Hours	Hours	w.r.t	Hours	w.r.t	Hours	Per PPA	Allowed	Hours	(Million kWh)	(Rs./kWh)*	(Rs.Billion
		Tariff	(PH)	(POH)	PH	(UOH)	PH	w.r.t PH	(%)	Limit by	Consumed	()	(,	(1.5.5.1.0.1
		(MW)			/.			(%)		(%)		10 10*0		
1	2	3	4	5	6=5/4	7	8=7/4	9=6+8	10	11=9-10	12=11*4	13=12*3	14	15=13*14
1	2016-17 2017-18	48.5 48.5	8760 8760	0	0.0%	8016	91.5% 100.0%	91.5% 100.0%	17.4% 17.4%	74.2% 82.6%	6496 7236	315.056 350.934	11 7.7	3.466 2.702
	2017-18	48.5	8760	720	8.2%	8760 372	4.2%	12.5%	17.4%	0%	0	0	11	0
2	2010-17	48.5	8760	720	8.2%	74.92	0.9%	9.1%	17.4%	0%	0	0	7.7	0
2			0,00	,20	0.270	,JL	0.070	5.170	27.470	370	5	315.056		3.466
	2016-17	97										350.934		2.702
Overall	2016-17 2017-18					Total						665.990		6.168
	2016-17 2017-18						CCPP NA	NDIPUR						
										Vieletien		1		
		Net						Total		VIOLATION				
		Net Capacity	Period	Planned	% of	UnPlanned	% of	Total Outage	Allowed	Violation of	Extra	Frank i		F
			Period Hours	Outage	РОН	Outage	UOH		Limit as		Outage	Energy Loss	Unit Rate	
Overall	2017-18	Capacity		Outage Hours	POH w.r.t	Outage Hours	UOH w.r.t	Outage	Limit as Per PPA	of	Outage Hours	Energy Loss (Million kWh)	Unit Rate (Rs./kWh)*	
Overall	2017-18	Capacity as per	Hours	Outage	РОН	Outage	UOH	Outage Hours	Limit as	of Allowed	Outage			
Overall	2017-18	Capacity as per Tariff	Hours	Outage Hours	POH w.r.t	Outage Hours	UOH w.r.t	Outage Hours w.r.t PH	Limit as Per PPA	of Allowed Limit by	Outage Hours			(Rs.Billion
Overall Units	2017-18 Year 2 2016-17	Capacity as per Tariff (MW) 3 411.34	Hours (PH) 4 8760	Outage Hours (POH) 5 3933.9	POH w.r.t PH 6=5/4 44.9%	Outage Hours (UOH) 7 35	UOH w.r.t PH 8=7/4 0.4%	Outage Hours w.r.t PH (%) 9=6+8 45.3%	Limit as Per PPA (%) 10 18.4%	of Allowed Limit by (%) 11=9-10 26.9%	Outage Hours Consumed 12=11*4 2357	(Million kWh) 13=12*3 969.553	(Rs./kWh)* 14 8	Energy Cos (Rs.Billion 15=13*14 7.756
Overall Units	2017-18 Year 2	Capacity as per Tariff (MW) 3	Hours (PH) 4	Outage Hours (POH) 5	POH w.r.t PH 6=5/4 44.9% 5.7%	Outage Hours (UOH) 7	UOH w.r.t PH 8=7/4	Outage Hours w.r.t PH (%) 9=6+8	Limit as Per PPA (%) 10	of Allowed Limit by (%) 11=9-10	Outage Hours Consumed 12=11*4	(Million kWh) 13=12*3	(Rs./kWh)* 14	(Rs.Billion 15=13*14

Annex III Page 1 of 4

			TPS	JAMSHO	RO (1*250	+ 3*200 = 8	350 MW)		
		Capacit	ty (MW)		Au	xiliary Cons	umption during S	Standby Mode	
Unit	Year	Installed	De-rated	Act %	tual MW	Standby Hours	Energy Loss (Million kWh)	Unit Rate (Rs/kWh)*	Financial Impact (Rs. Billion)
		1	2		3	4	5=3*4	6	7=5*6
	2016-17			0.45	0.90	802	0.722	5.4	0.004
1	2017-18	250	200	1.08	2.16	3930	8.490	6.1	0.052
	2016-17			0.38	0.65	557	0.360	5.4	0.002
2	2017-18	200	170	1.5	2.53	4459	11.295	6.1	0.069
_	2016-17			1.28	2.18	1330	2.893	5.4	0.016
3	2017-18	200	170	1.04	1.77	3982	7.041	6.1	0.043
	2016-17			0.48	0.82	1010	0.824	5.4	0.004
4	2017-18	200	170	0.94	1.60	1918	3.066	6.1	0.019
	2016-17						4.799		0.026
Overall	2017-18	850	710				29.892		0.182
	TOTAL						34.691		0.208
				GTPS КОТ	RI (4*25 +	1*44 = 144	MW)		B
	1	Capacit	ty (MW)				umption during S	Standby Mode	
				Ac	tual	Standby	Energy Loss	Unit Rate	Financial Impact
Unit	Year	Installed	De-rated	%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		1	2		3	4	5=3*4	6	7=5*6
2	2016-17	25	22	0.02	0.00	4104	0.018	5.4	0.0001
3	2017-18	25	22	0.10	0.02	5812	0.128	6.1	0.001
4	2016-17	25	22	0.02	0.00	4472	0.020	5.4	0.0001
4	2017-18	25	22	0.11	0.02	7022	0.170	6.1	0.001
-	2016-17	25	22	0.04	0.01	3630	0.032	5.4	0.0002
5	2017-18	25	22	0.28	0.06	7333	0.452	6.1	0.003
C	2016-17	25	22	0.04	0.01	4939	0.043	5.4	0.0002
6	2017-18	25	22	0.16	0.04	7387	0.260	6.1	0.002
	2016-17	44	44	0.73	0.32	4088	1.313	5.4	0.007
7	2017-18	44	44	3.71	1.63	7095	11.581	6.1	0.071
7	2017 10						1.426		0.008
	2017-18	144	122				11420		0.000
7 Overall		144	132				12.591		0.077

NOTE

* Unit rate for each year has been calculated by averaging the Energy Sale Price as mentioned in the monthly Energy Procurement Reports of that year.

Annex III Page 2 of 4

		TPS (110 + 2* 2	10 + 6*100	+ 2*136 +	1*143 = 1600 N	AW)			
		Capacit		110 . 2 2			umption during S				
Unit				Actual		Standby	Energy Loss	Unit Rate	Financial Impact		
	Year	Installed	De-rated	%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)		
		1	2		3	4	5=3*4	6	7=5*6		
1	2016-17	110	85	0	0	0	0	5.4	0		
I	2017-18	110	65	0	0	0	0	6.1	0		
2	2016-17	110	85	0	0	0	0	5.4	0		
2	2017-18	110	00	0	0	0	0	6.1	0		
3	2016-17	210	180	0.83	1.49	5773	8.624	5.4	0.046		
5	2017-18	210	100	0.74	1.33	6478	8.628	6.1	0.053		
4	2016-17	210	180	0	0	0	0	5.4	0		
	2017-18			0	0	0	0	6.1	0		
5	2016-17	100	85	0.83	0.71	1826	1.288	5.4	0.007		
	2017-18			0	0	0	0	6.1	0		
6	2016-17	100	85	1.13	0.96	2317	2.225	5.4	0.012		
	2017-18			0	0	0	0	6.1	0		
7	2016-17 2017-18	100	95	0.09	0.09	1833	0.157	5.4	0.001		
				-	-	7	0	6.1	0		
8	2016-17 2017-18	100	95	0.07	0.07	1512	0.101	5.4 6.1	0.001		
						578	0.011	5.4	0.0001		
9	2016-17 2017-18	100	95	0.01	0	65 355	0.003	5.4 6.1	0.00002		
	2017-18			0.01	0.01	1947	0.166	5.4	0.0002		
10	2018-17	100	95	0.09	0.09	491	0.009	6.1	0.0001		
	2017-13	136		0.02	0.02	3925	0.459	5.4	0.002		
11	2010-17		130	0.03	0.03	577	0.015	6.1	0.0001		
	2016-17			0.11	0.14	4339	0.620	5.4	0.003		
12	2010-17	136	130	0.01	0.01	579	0.008	6.1	0.00005		
	2016-17	5-17		0	0	0	0	5.4	0		
13	2017-18	143	140	0	0	0	0	6.1	0		
	2016-17						13.641	-	0.073		
Overall	2017-18	1655	1480				8.675		0.053		
	TO	TAL					22.316		0.126		
			GUDDU	747 CCPP	(2*255.6+	1*265.5 =					
		Capacit	y (MW)	J 747 CCPP (2*255.6 + 1*265.5 = 776.7 MW) Auxiliary Consumption during Standby Mode							
				Actual		Standby	Energy Loss	Unit Rate	Financial Impact		
Unit	Year	Installed	De-rated	%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)		
		1	2		3	4	5=3*4	6	7=5*6		
	2016-17			0	0	0	0	5.4	0		
14	2017-18	255.6	243	0	0	0	0	6.1	0		
	2016-17	1		0	0	142	0	5.4	0		
15	2017-18	255.6	243	0	0	0	0	6.1	0		
4.6	2016-17	265 5	261	0	0	0	0	5.4	0		
16	2017-18	265.5	261	0	0	0	0	6.1	0		
	2016-17						0		0		
Overall	2017-18	776.7	747				0		0		
			AL				0		0		

NOTE

* Unit rate for each year has been calculated by averaging the Energy Sale Price as mentioned in the monthly Energy Procurement Reports of that year.

Annex III Page 3 of 4

ENERGY L	OSS AND SU	JBSEQUENT	FINANCIAL	IMPACT D	UE TO AUX	ILIARY CON	SUMPTION DURI	NG STANDBY	MODE (GENCO III)
			TDS Muzz	ffargarh (2*210 ± 1*	220 + 2*20	0 = 1350 MW)		
		Conocit	r MW)	nargarn (tandhu Mada	
		Capacit	.y (IVI VV)	٨٥	tual	Standby	umption during S	-	Financial Impac
Unit	Year	Installed	De-rated	-		Hours	Energy Loss	Unit Rate	Financial Impac (Rs. Billion)
			-	% MW			(Million kWh)	(Rs/kWh)*	. ,
	2016 17	1	2		3	4	5=3*4	6	7=5*6
1	2016-17 2017-18	210	200	0.48	0.95	908.3	0.867	5.4	0.005
						3721.7	5.888	6.1	
2	2016-17 2017-18	210	200	0.45	0.89	919.2	0.822	5.4	0.004
						3726.2	3.063	6.1	
3	2016-17 2017-18	210	200	0.26	0.52	1237.7	0.649	5.4	0.004
						3602.4	2.363	6.1	
4	2016-17 2017-18	320	300	0.13	0.39	863.2	0.339	5.4	0.002
						3656.2	6.285	6.1	
5	2016-17 2017-18	200	200	1.02 2.12	2.04 4.24	1811.7	3.696	5.4	0.02 0.108
						4182.7	17.735	6.1	
6	2016-17 2017-18	200	200	1.24 2.22	2.48	2305.4	5.717	5.4	0.031 0.115
	2017-18 2016-17			2.22	4.44	4237.1	18.813 12.089	6.1	0.065
Overall	2017-18	1350	1300				54.146		0.330
							66.235		0.330
	10	TAL							0.590
				PS Faisala		+ 1*44 = 14			
		Capacit	:y (MW)			· · ·	umption during S	· · ·	
Unit	Year	Installed	De-rated	-	tual	Standby	Energy Loss	Unit Rate	Financial Impac
				%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		1	2		3	4	5=3*4	6	7=5*6
5	2016-17	25	23	0.30	0.07	6578	0.448	5.4	0.002
-	2017-18	20	20	0.64	0.15	7391.1	1.095	6.1	0.007
6	2016-17	25	23	0.33	0.08	6670.2	0.511	5.4	0.003
Ũ	2017-18	20	20	0.77	0.18	7327.2	1.304	6.1	0.008
7	2016-17	25	23	0.31	0.07	6625.8	0.479	5.4	0.003
,	2017-18	25		0.58	0.13	7452.9	0.998	6.1	0.006
8	2016-17	25	23	0.28	0.06	6581.3	0.424	5.4	0.002
-	2017-18	20	20	0.80	0.18	7726.8	1.416	6.1	0.009
9	2016-17	44	42	0.74	0.31	5874.2	1.831	5.4	0.010
-	2017-18			4.61	1.93	7407.3	14.326	6.1	0.087
Overall	2016-17	144	134				3.692		0.020
overall	2017-18	144	134				19.140		0.117
	TO	TAL					22.831		0.137
				SPS Fais	alabad (2*	66 = 132 M	W)		
		Capacity (MW)		Auxiliary Consumption during Standby M					
110.14	Vern	Installed	Do retail	Ac	tual	Standby	Energy Loss	Unit Rate	Financial Impac
Unit	Year	Installed	d De-rated	%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		1	2		3	4	5=3*4	6	7=5*6
1	2016-17	66	50	1.20	0.60	744	0.446	5.4	0.002
1	2017-18	66	50	0	0	0	0	6.1	0
2	2016-17		50	1.20	0.60	4643.7	2.786	5.4	0.015
2	2017-18	66	50	1.25	0.63	7777.9	4.861	6.1	0.030
Q	2016-17	400	460				3.233		0.017
Overall	2017-18	132	100				4.861		0.030
	TO	TAL					8.094		0.047
				ССРР	Nandinur	(425 MW)			
		Canacit	y (MW)				umption during S	tandby Mode	
		capacit	, (٨٣	tual	Standby	Energy Loss	Unit Rate	Financial Impac
Unit	Year	Installed	De-rated	AC %	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)
		1	2		3	4			(KS. Billion) 7=5*6
	2016 17	1	2				5=3*4	6	
1	2016-17 2017-18	425	425	1.98 1.28	8.42 5.44	55 017 1	0.463	5.4	0.0025
				1.20	J.44	917.1	4.989	6.1	0.030
	TO.	TAL					5.452		0.033

NOTE

* Unit rate for each year has been calculated by averaging the Energy Sale Price as mentioned in the monthly Energy Procurement Reports of that year.

Annex III Page 4 of 4

ENERG	LOSS AND	SUBSEQUE	NT FINANCI	AL IMPACI	DUE TO AU (GENCO		INSUMPTION DUP	RING DURING S	TANDBY MODE		
			L	akhra Pov	ver Station	ı (3*50 = 15	60 MW)				
		Capacit	y (MW)	Auxiliary Consumption during Standby Mode							
Unit	Year	Installed	De-rated	Actual		Standby	Energy Loss	Unit Rate	Financial Impact		
Onit	Tear	instaneu	Denateu	%	MW	Hours	(Million kWh)	(Rs/kWh)*	(Rs. Billion)		
		1	2		3	4	5=3*4	6	7=5*6		
1	2016-17	50	40	0	0	0	0	5.4	0		
T	2017-18	50		0	0	0	0	6.1	0		
2	2016-17	50	40	0	0	0	0	5.4	0		
2	2017-18	50		0	0	0	0	6.1	0		
3	2016-17 2017-18	50	40			-	-	-	-		
Querell	2016-17	150	120				0		0		
Overall	2017-18	150	120				0		0		
	TOTAL						0		0		

NOTE

* Unit rate for each year has been calculated by averaging the Energy Sale Price as mentioned in the monthly Energy Procurement Reports of that year.

Annex IV

	Net Capacit	y Factor (%)	Net Output	Factor (%)	Energy Availability Factor (%)	
Unit No.	FY 2016-17	FY 2017-18	FY 2016-17	FY 2017-18	FY 2016-17	FY 2017-18
			GENCO I			
TPS JAMSHO	RO					
1	52	26	71	63	61	72
2	49	25	84	75	56	75
3	57	32	81	74	73	77
4	72	43	84	74	85	63
GTPS KOTRI						
3	55	14	104	103	100	80
4	42	13	85	90	100	95
5	33	8	97	88	76	93
6	36	13	86	85	98	100
7	27	7	61	45	92	96
		-	GENCO II			
TPS GUDDU						
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	14	17	63	70	88	99
4	0	0	0	0	0	0
5	38	57	50	60	95	82
6	36	32	65	35	79	76
7	61	99	99	105	82	90
8	62	6	91	8	85	83
9	57	94	129	103	44	94
10	59	85	102	100	78	86
11	38	27	71	71	99	44
12	33	65	65	74	101	94
13	0	0	0	0	0	0
GUDDU 747	ССРР					
14	71	67	82	83	87	80
15	68	69	79	83	88	82
16	62	43	73	69	85	62
			GENCO III			
TPS MUZAFF	ARGARH					
1	62	36	79	75	60	67
2	63	36	81	76	57	69
3	58	39	79	77	60	71
4	53	29	77	62	78	89
5	43	17	68	57	53	52
6	41	18	66	54	66	65

Annex IV

						•		
Unit No.	Net Capacit	y Factor (%)	Net Output	t Factor (%)	Energy Availability Factor (%)			
Unit No.	FY 2016-17	FY 2017-18	FY 2016-17	FY 2017-18	FY 2016-17	FY 2017-18		
			GENCO III					
GTPS FAISAL	ABAD							
5	19	10	77	73	97	97		
6	17	8	76	72	97	94		
7	18	11	74	76	97	99		
8	19	8	80	79	98	98		
9	15	10	61	67	90	98		
SPS FAISALA	BAD							
1	0	0%	0	0	8	0		
2	29	2%	85	80	86	91		
CCPP NANDI	PUR							
Complex	40	61	74	73	45	56		
			GENCO IV					
LAKHRA POV	VER STATION							
1	2	1	63	54	3	3		
2	30	3	66	54	46	6		
3	REQUIRES REHABILITATION							