National Electric Power Company Hashemite Kingdom of Jordan

Project for the Study on the Electricity Sector Master Plan in the Hashemite Kingdom of Jordan

Final Report (Appendix)

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JERA Co., Inc. Nippon Koei Co., Ltd.

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Appendix

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Chapter 4 Power Demand Forecasts

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4.1 Result of Macro Method Power Demand Forecast (2015 - 2040) [Appendix-1]

Table 1 (Appendix of Table 4.3-5 ~ Table 4.3-7)Result of Macro Method Power Demand Forecast (2015 - 2040)

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		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Purchased Energy																											
High Case	(GWh)	18,390	19,528	20,729	22,010	23,361	24,783	26,289	27,878	29,531	31,308	33,186	35,163	37,254	39,460	41,786	44,239	46,815	49,531	52,383	55,398	58,574	61,922	65,451	69,169	73,083	77,19
M edium Case	(GWh)	17,898	18,622	19,375	20,164	20,987	21,837	22,725	23,649	24,584	25,588	26,635	27,721	28,852	30,029	31,252	32,524	33,837	35,201	36,607	38,077	39,603	41,190	42,842	44,556	46,334	48,17
Low Case	(GWh)	17,638	18,204	18,790	19,398	20,032	20,682	21,361	22,062	22,762	23,518	24,304	25,115	25,956	26,828	27,729	28,663	29,623	30,614	31,629	32,689	33,783	34,918	36,094	37,308	38,563	39,849
High Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1) Power Consumption of Distribution Companies	(GWh)	15,709	16,710	17,768	18,887	20,069	21,319	22,639	24,034	25,507	27,063	28,706	30,440	32,272	34,205	36,245	38,397	40,669	43,065	45,593	48,260	51,072	54,037	57,163	60,460	63,935	67,597
2) Sales Energy to Large Consumer	(GWh)	1,209	1,229	1,245	1,309	1,342	1,372	1,403	1,434	1,464	1,495	1,527	1,555	1,586	1,617	1,648	1,681	1,698	1,716	1,734	1,751	1,769	1,788	1,807	1,826	1,846	1,884
3) Power Selling to Overseas	(GWh)	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
4) T/L Loss	(GWh)	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1,011	1,061	1,114	1,169	1,226	1,285
5) D/L Loss	(GWh)	1,092	1,189	1,295	1,370	1,481	1,602	1,734	1,874	1,993	2,151	2,319	2,498	2,687	2,888	3,099	3,321	3,567	3,827	4,099	4,385	4,683	4,997	5,328	5,675	6,037	6,389
Total		18,390	19,528	20,729	22,010	23,361	24,783	26,289	27,878	29,531	31,308	33,186	35,163	37,254	39,460	41,786	44,239	46,815	49,531	52,383	55,398	58,574	61,922	65,451	69,169	73,083	77,194
Medium Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1) Power Consumption of Distribution Companies	(GWh)	15,331	15,920	16,531	17,164	17,821	18,502	19,207	19,939	20,697	21,483	22,298	23,143	24,018	24,925	25,865	26,839	27,849	28,895	29,979	31,102	32,266	33,472	34,722	36,017	37,358	38,748
2) Sales Energy to Large Consumer	(GWh)	1,099	1,117	1,132	1,190	1,220	1,247	1,275	1,304	1,331	1,359	1,388	1,414	1,442	1,470	1,498	1,528	1,544	1,560	1,576	1,592	1,608	1,625	1,643	1,660	1,678	1,713
3) Power Selling to Overseas	(GWh)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
4) T/L Loss	(GWh)	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1,011	1,061	1,114	1,169	1,226	1,285
5) D/L Loss	(GWh)	1,092	1,189	1,295	1,370	1,481	1,602	1,734	1,874	1,993	2,151	2,319	2,498	2,687	2,888	3,099	3,321	3,567	3,827	4,099	4,385	4,683	4,997	5,328	5,675	6,037	6,389
Total		17,898	18,622	19,375	20,164	20,987	21,837	22,725	23,649	24,584	25,588	26,635	27,721	28,852	30,029	31,252	32,524	33,837	35,201	36,607	38,077	39,603	41,190	42,842	44,556	46,334	48,170
Medium Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1) Power Consumption of Distribution Companies	(GWh)	15,184	15,617	16,062	16,520	16,991	17,475	17,973	18,485	19,011	19,552	20,109	20,681	21,269	21,874	22,495	23,134	23,792	24,467	25,162	25,876	26,610	27,365	28,141	28,938	29,758	30,601
2) Sales Energy to Large Consumer	(GWh)	989	1,005	1,019	1,071	1,098	1,122	1,148	1,174	1,198	1,223	1,249	1,273	1,298	1,323	1,348	1,375	1,390	1,404	1,418	1,433	1,447	1,463	1,479	1,494	1,510	1,542
3) Power Selling to Overseas	(GWh)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
4) T/L Loss	(GWh)	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1,011	1,061	1,114	1,169	1,226	1,285
5) D/L Loss	(GWh)	1,092	1,189	1,295	1,370	1,481	1,602	1,734	1,874	1,993	2,151	2,319	2,498	2,687	2,888	3,099	3,321	3,567	3,827	4,099	4,385	4,683	4,997	5,328	5,675	6,037	6,389
Total		17,638	18,204	18,790	19,398	20,032	20,682	21,361	22,062	22,762	23,518	24.304	25.115	25,956	26,828	27,729	28,663	29.623	30,614	31,629	32,689	33,783	34,918	36,094	37.308	38,563	39,849

4.2 Result of Micro Method Power Demand Forecast (2015 - 2040) [Appendix -2]

		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Purchased Energy																											
High Case	(GWh)	19,802	20,863	21,777	22,874	24,056	25,271	26,571	27,683	29,389	30,943	32,610	34,352	36,224	38,221	40,349	42,621	45,028	47,601	50,306	53,217	56,330	59,666	63,244	67,076	71,181	75,573
Medium Case	(GWh)	18,655	19,583	20,370	21,309	22,317	23,343	24,434	25,581	26,759	28,026	29,372	30,762	32,241	33,804	35,449	37,187	39,004	40,923	42,912	45,028	47,262	49,626	52,130	54,777	57,574	60,520
Low Case	(GWh)	17,508	18,306	18,968	19,758	20,606	21,459	22,361	23,302	24,254	25,275	26,353	27,452	28,614	29,829	31,095	32,420	33,789	35,220	36,682	38,222	39,830	41,512	43,274	45,114	47,033	49,023
High Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1. Sales Energy	(GWh)	17.122	18.046	18.816	19,751	20,764	21.808	22,922	23.839	25,366	26.699	28.131	29.629	31,242	32,967	34,809	36,780	38,882	41.135	43.517	46.080	48.829	51,782	54,956	58,367	62.034	65,976
1) Domestic	(GWh)	6,070	6,235	6,397	6,556	6,712	6,873	7,033	7,193	7,352	7,512	7,671	7,831	7,990	8,151	8,312	8,472	8,627	8,780	8,931	9,080	9,227	9,371	9,513	9,651	9,787	9,919
2) Commercial	(GWh)	2,497	2,703	2,925	3,170	3,457	3,770	4,131	4,257	4,961	5,436	5,957	6,528	7,154	7,840	8,591	9,415	10,317	11,306	12,359	13,527	14,805	16,205	17,736	19,412	21,246	23,254
3) Industry	(GWh)	4,161	4,482	4,809	5,180	5,587	5,996	6,434	6,905	7,410	7,952	8,534	9,158	9,828	10,547	11,318	12,146	13,034	13,988	15,011	16,109	17,288	18,552	19,909	21,366	22,929	24,606
4) Public	(GWh)	1,311	1,340	1,369	1,398	1,426	1,454	1,482	1,508	1,536	1,562	1,588	1,614	1,640	1,666	1,691	1,716	1,740	1,765	1,789	1,813	1,836	1,860	1,884	1,907	1,928	1,947
5) Water Pumping	(GWh)	2,734	2,935	2,963	3,092	3,225	3,356	3,481	3,613	3,742	3,871	4,012	4,128	4,258	4,389	4,521	4,654	4,784	4,915	5,043	5,165	5,286	5,405	5,523	5,639	5,750	5,854
6) Street Lighting	(GWh)	349	351	353	355	357	359	361	363	364	366	368	370	372	374	376	378	379	381	383	385	387	389	391	392	394	396
2. Sales Energy to Large Consumer	(GWh)	1,209	1,229	1,245	1,309	1,342	1,372	1,403	1,434	1,464	1,495	1,527	1,555	1,586	1,617	1,648	1,681	1,698	1,716	1,734	1,751	1,769	1,788	1,807	1,826	1,846	1,884
3. Power Selling to	(GWh)	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Overseas 4. T/L Loss	(GWh)	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1.011	1.061	1.114	1,169	1.226	1,285
5. D/L Loss	(GWh)	1.092	1.189	1.295	1.370	1.481	1.602	1.734	1.874	1.993	2.151	2.319	2,498	2.687	2.888	3.099	3.321	3.567	3.827	4.099	4.385	4.683	4.997	5.328	5.675	6.037	6.389
Total	(GWh)	19.802	20.863	21.777	22,874	24 056	25 271	26.571	27.683	29 389	30 943	32,610	34 352	36.224	38 221	40.349	42.621	45.028	47.601	50,306	53,217	56.330	59.666	63 244	67.076	71.181	75,573
	(0111)	19,002	20,000	21,777	22,071	21,000	20,271	20,071	27,005	27,507	50,515	52,010	51,552	50,221	50,221	10,517	12,021	10,020	17,001	50,500	55,217	50,550	59,000	05,211	07,070	/1,101	10,010
Medium Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1. Sales Energy	(GWh)	16,088	16,881	17,526	18,309	19,151	20,008	20,916	21,871	22,872	23,921	25,035	26,184	27,407	28,700	30,062	31,502	33,016	34,617	36,284	38,053	39,925	41,908	44,010	46,238	48,598	51,098
1) Domestic	(GWh)	5,518	5,669	5,816	5,960	6,102	6,248	6,394	6,539	6,684	6,829	6,974	7,119	7,264	7,410	7,556	7,702	7,843	7,982	8,119	8,255	8,388	8,519	8,648	8,774	8,897	9,017
2) Commercial	(GWh)	2,466	2,636	2,818	3,015	3,247	3,497	3,785	4,097	4,434	4,799	5,195	5,622	6,085	6,587	7,129	7,716	8,352	9,039	9,759	10,550	11,404	12,328	13,327	14,406	15,573	16,834
3) Industry	(GWh)	4,109	4,371	4,633	4,929	5,250	5,564	5,897	6,250	6,624	7,021	7,441	7,886	8,358	8,858	9,389	9,950	10,546	11,177	11,846	12,555	13,307	14,103	14,947	15,842	16,790	17,795
4) Public	(GWh)	1,192	1,218	1,245	1,271	1,296	1,322	1,347	1,371	1,396	1,420	1,444	1,467	1,491	1,514	1,537	1,560	1,582	1,604	1,627	1,648	1,669	1,691	1,713	1,733	1,752	1,770
5) Water Pumping	(GWh)	2,485	2,668	2,694	2,811	2,932	3,051	3,165	3,284	3,402	3,519	3,647	3,753	3,871	3,990	4,110	4,231	4,349	4,468	4,584	4,696	4,805	4,913	5,021	5,126	5,227	5,322
6) Street Lighting	(GWh)	318	319	321	323	324	326	328	330	331	333	335	336	338	340	341	343	345	347	348	350	352	353	355	357	358	360
2. Sales Energy to Large Consumer	(GWh)	1,099	1,117	1,132	1,190	1,220	1,247	1,275	1,304	1,331	1,359	1,388	1,414	1,442	1,470	1,498	1,528	1,544	1,560	1,576	1,592	1,608	1,625	1,643	1,660	1,678	1,713
3. Power Selling to Overseas	(GWh)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
4. T/L Loss	(GWh)	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1,011	1,061	1,114	1,169	1,226	1,285
5. D/L Loss	(GWh)	1,092	1,189	1,295	1,370	1,481	1,602	1,734	1,874	1,993	2,151	2,319	2,498	2,687	2,888	3,099	3,321	3,567	3,827	4,099	4,385	4,683	4,997	5,328	5,675	6,037	6,389
Total	(GWh)	18,655	19,583	20,370	21,309	22,317	23,343	24,434	25,581	26,759	28,026	29,372	30,762	32,241	33,804	35,449	37,187	39,004	40,923	42,912	45,028	47,262	49,626	52,130	54,777	57,574	60,520
Low Case		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1. Sales Energy	(GWh)	15.054	15.719	16,241	16,881	17.566	18.253	18,974	19.725	20.504	21.310	22.159	23.019	23.927	24.875	25,862	26.892	27,959	29.073	30.215	31.410	32,657	33,960	35.322	36,744	38.228	39,776
1) Domestic	(GWh)	4,967	5,102	5.234	5,364	5,491	5,623	5,754	5,885	6.016	6,146	6,276	6.407	6,538	6,669	6,800	6.931	7,058	7,184	7,307	7,429	7,550	7,667	7,783	7,897	8,007	8,115
2) Commercial	(GWh)	2,435	2,570	2,712	2,866	3,048	3,241	3,465	3,703	3,958	4.231	4.522	4,833	5,166	5,522	5,902	6,308	6,742	7,207	7,683	8,202	8,756	9.347	9.978	10,651	11.370	12,137
3) Industry	(GWh)	· ·	4,263	4,461	4,686	4,930	5,159	5,399	5,650	5,913	6,189	6,477	6,778	7,094	7,424	7,770	8,131	8,510	8,906	9,321	9,754	10,209	10,684	11,181	11,702	12.246	12,816
4) Public	(GWh)	1,072	1,096	1,120	1,144	1,166	1,190	1,213	1,234	1,257	1,278	1,300	1,320	1,342	1,363	1,383	1,404	1,424	1.444	1,464	1,483	1,502	1,522	1,542	1,560	1,577	1,593
5) Water Pumping	(GWh)	2.237	2.401	2.424	2.530	2,638	2,746	2,848	2,956	3.062	3.167	3,283	3,378	3.484	3,591	3.699	3.808	3,914	4,021	4,126	4,226	4.325	4,422	4.519	4.614	4,705	4,790
6) Street Lighting	(GWh)	286	287	289	2,000	292	294	295	297	298	300	301	303	304	306	307	309	310	312	313	315	317	318	320	321	323	324
2. Sales Energy to Large Consumer	(GWh)	989	1,005	1,019	1,071	1,098	1,122	1,148	1,174	1,198	1,223	1,249	1,273	1,298	1,323	1,348	1,375	1,390	1,404	1,418	1,433	1,447	1,463	1,479	1,494	1,510	1,542
3. Power Selling to	(GWh)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
	· /	341	361	382	405	430	451	474	497	528	560	595	631	670	711	755	801	842	884	918	963	1.011	1.061	1 1 1 1 2	1 160	1 226	1 285
Overseas 4. T/L Loss 5. D/L Loss	(GWh)	341	361 1.189	382 1 295	405 1.370	430 1.481	451 1.602	474	497 1.874	528 1 993	560 2.151	595 2 319	631 2.498	670 2.687	711	755	801	842 3.567	884	918 4 099	963 4 385	1,011 4.683	1,061	1,114	1,169 5.675	1,226	1,285 6,389

Table 2 (Appendix of Table 4.3-28 ~ Table 4.3-30) Result of Micro Method Power Demand Forecast (2015 - 2040)

4.3 Result of Peak Demand Forecast (LF=0.69) [Appendix -3]

		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Purchased Energy																											
High Case	(GWh)	19,802	20,863	21,777	22,874	24,056	25,271	26,571	27,683	29,389	30,943	32,610	34,352	36,224	38,221	40,349	42,621	45,028	47,601	50,306	53,217	56,330	59,666	63,244	67,076	71,181	75,573
Medium Case	(GWh)	18,655	19,583	20,370	21,309	22,317	23,343	24,434	25,581	26,759	28,026	29,372	30,762	32,241	33,804	35,449	37,187	39,004	40,923	42,912	45,028	47,262	49,626	52,130	54,777	57,574	60,520
Low Case	(GWh)	17,508	18,306	18,968	19,758	20,606	21,459	22,361	23,302	24,254	25,275	26,353	27,452	28,614	29,829	31,095	32,420	33,789	35,220	36,682	38,222	39,830	41,512	43,274	45,114	47,033	49,023
Peak Demand																											
High Case	(M W)	3,276	3,452	3,603	3,784	3,980	4,181	4,396	4,580	4,862	5,119	5,395	5,683	5,993	6,323	6,675	7,051	7,450	7,875	8,323	8,804	9,319	9,871	10,463	11,097	11,776	12,503
Medium Case	(M W)	3,086	3,240	3,370	3,525	3,692	3,862	4,042	4,232	4,427	4,637	4,859	5,089	5,334	5,593	5,865	6,152	6,453	6,770	7,099	7,450	7,819	8,210	8,625	9,062	9,525	10,013
Low Case	(M W)	2,897	3,029	3,138	3,269	3,409	3,550	3,699	3,855	4,013	4,182	4,360	4,542	4,734	4,935	5,144	5,364	5,590	5,827	6,069	6,324	6,590	6,868	7,159	7,464	7,781	8,111
Load Factor	-	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69

Table 3 (Appendix of Table 4.3-32) Result of Peak Demand Forecast (LF=0.69)

Source: JICA Study Team

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4.4 Result of Peak Demand Forecast (LF=0.64) [Appendix -4]

Table 4 (Appendix of Table 4.3-33)	Result of Peak Demand Forecast (LF=0.64)
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		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Purchased Energy																											
High Case	(GWh)	19,802	20,863	21,777	22,874	24,056	25,271	26,571	27,683	29,389	30,943	32,610	34,352	36,224	38,221	40,349	42,621	45,028	47,601	50,306	53,217	56,330	59,666	63,244	67,076	71,181	75,573
Medium Case	(GWh)	18,655	19,583	20,370	21,309	22,317	23,343	24,434	25,581	26,759	28,026	29,372	30,762	32,241	33,804	35,449	37,187	39,004	40,923	42,912	45,028	47,262	49,626	52,130	54,777	57,574	60,520
Low Case	(GWh)	17,508	18,306	18,968	19,758	20,606	21,459	22,361	23,302	24,254	25,275	26,353	27,452	28,614	29,829	31,095	32,420	33,789	35,220	36,682	38,222	39,830	41,512	43,274	45,114	47,033	49,023
Peak Demand																											
High Case	(M W)	3,532	3,721	3,884	4,080	4,291	4,508	4,739	4,938	5,242	5,519	5,817	6,127	6,461	6,817	7,197	7,602	8,032	8,490	8,973	9,492	10,047	10,642	11,281	11,964	12,696	13,480
Medium Case	(M W)	3,327	3,493	3,633	3,801	3,981	4,164	4,358	4,563	4,773	4,999	5,239	5,487	5,751	6,030	6,323	6,633	6,957	7,299	7,654	8,032	8,430	8,852	9,298	9,771	10,269	10,795
Low Case	(M W)	3,123	3,265	3,383	3,524	3,676	3,828	3,988	4,156	4,326	4,508	4,701	4,897	5,104	5,320	5,546	5,783	6,027	6,282	6,543	6,818	7,104	7,404	7,719	8,047	8,389	8,744
Load Factor	-	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64

Power System Plan Chapter 5

BSP Analysis by the BSP Grouping Method 5.1

(1) BSP Analysis for JEPCO

Table 1 BSP Analysis by the BSP Grouping Method for JEPCO in 2016

						Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP	BSP		No	. of TR	's	Capacity	Nº1 Capacity	Peak Deman	d 2016	Group	Load Transfer MVA	Possible Load	N-1 Observation	
ouping	(Substation)					[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1 4	ABDOON	80	80	80		240	160	120.9	50%		0.0	48.0	OK	
1 4	AMMAN S	45	45	45		135	90	109.2	81%	76%	19.2	41.6	OK	
1 4	AMMAN S NEW	80	80			160	80	168.7	105%	10%	88.7	63.2	No	
1 4	ASHRFIA	63	63			126	63	104.1	83%		41.1	51.3	OK	
2	MANARAH	80	80	80		240	160	54.4	23%		0.0	49.0	OK	
2 s	SAHAB	63	63	63		189	126	138.1	73%	41%	12.1	25.0	OK	
2 🛚	WWQAR	80	80			160	80	51.5	32%		0.0	24.0	OK	
3 🗚	ABDALI	40	40	40		120	80	67.9	57%		0.0	18.0	OK	
3 4	ABDALI NEW	80	80			160	80	143.2	89%		63.2	25.0	No	
3 +	HIZAM	80	80	80		240	160		0%	45%	0.0	36.0	OK	NEPCO ongoing project
3 z	ZERQA	30	30	30	40	130	90	93.0	72%	4070	3.0	18.8	OK	
9	ZERQA TR5	63				63	0	24.0	38%		24.0	27.0	OK	
3 🖬	DHULEIL	80	80			160	80	61.3	38%		0.0	23.1	OK	
4 c	CITY CENTER	80	80	80		240	160	127.0	53%		0.0	111.6	OK	
4 🛚	MARQA	45	63	80		188	108	181.4	97%	64%	73.4	49.5	No	
4 T	TAREQ	80	_	80		240	160	121.3	51%		0.0	80.2	OK	
5 🖻	BAYADER	80	80	80		240	160	198.2	83%		38.2	79.2	OK	
5	New BAYDER	80	80			160	80		0%		0.0	24.0		NEPCO ongoing project
5 s	SALT	80	80			160	80	173.4	108%	68%	93.4	29.5	No	
0	JNIVERSITY		_	80		240	160	178.6	74%		18.6	85.2	OK	
9	SUBEIHI	63	_	63		189	126	123.8	65%		0.0	5.2	OK	
6 0	AIA	45	45			90	45	14.5	16%		0.0	24.5	OK	
6 0	QAIA New	80	80			160	80	102.3	64%	45%	22.3	24.0	OK	
6	MADABA SOUTH	80	80	80		240	160	103.9	43%		0	35.0	OK	
								Avera	ae	57%				

ii) After countermeasures

						Installed	N-1 Capacity	Norma	I State Ar	alysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of TF	₹'s	Capacity	Ner Capacity	Peak Deman	d 2016	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfel Detween BSPS
1	ABDOON	80	80	80		240	160	136.9	57%		0.0	48.0	OK	From Amman S New
1	AMMANS	45	45	45		135	90	109.2	81%	71%	19.2	41.6	OK	
1	AMMAN S NEW	80	80			160	80	120.7	75%	/1/0	40.7	63.2	OK	To New Bayader 20% (32MVA), Abdoon 10% (16MV
1	ASHRFIA	63	63			126	63	104.1	83%		41.1	51.3	OK	
2	MANARAH	80	80	80		240	160	54.4	23%		0.0	49.0	OK	
2	SAHAB	63	63	63		189	126	138.1	73%	41%	12.1	25.0	OK	
2	MWQAR	80	80			160	80	51.5	32%		0.0	24.0	OK	
3	ABDALI	40	40	40		120	80	67.9	57%		0.0	18.0	OK	
3	ABDALI NEW	80	80			160	80	79.2	49%		0.0	25.0	OK	To HIZAM 40%(64MVA)
3	HIZAM	80	80	80		240	160	120.4	50%	51%	0.0	36.0	OK	From ABDLAI NEW, Marga
3	ZERQA	30	30	30	40	130	90	93.0	72%	51%	3.0	18.8	OK	•
3	ZERQA TR5	63				63	0	24.0	38%		24.0	27.0	OK	
3	DHULEIL	80	80			160	80	61.3	38%		0.0	23.1	OK	
4	CITY CENTER	80	80	80		240	160	127.0	53%		0.0	111.6	OK	
4	MARQA	45	63	80		188	108	125.0	67%	56%	17.0	49.5	OK	To HIZAM 30%(56.4MVA)
4	TAREQ	80	80	80		240	160	121.3	51%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	198.2	83%		38.2	79.2	OK	
5	New BAYDER	80	80			160	80	80.0	50%		0.0	24.0	OK	From AMMAN SNEW, Salt
5	SALT	80	80			160	160	125.4	78%	71%	0.0	29.5	ОК	To New Bayder 30%(48MVA)
5	UNIVERSITY	80	80	80		240	160	178.6	74%		18.6	85.2	OK	
5	Subeihi	63	63	63		189	126	123.8	65%	1	0.0	5.2	OK	1
6	QAIA	45	45			90	45	14.5	16%		0.0	24.5	OK	
6	QAIA New	80	80			160	80	102.3	64%	45%	22.3	24.0	ОК	1
6	MADABA SOUTH	80	80	80		240	160	103.9	43%	1	0.0	35.0	ОК	1
	1						1	Avera	ae	56%				1

BSP	BSP		No	. of Ti	Pla		Installed Capacity	N-1 Capacity	Norma Peak Deman	State Ar	alysis Group	Load Transfer MVA		<u> </u>	State Analysis
Grouping	(Substation)		140	. 01 11			[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	80	80	80		1	240	160	149.0	62%	(76)	0.0	48.0	ОК	
1	AMMANS	_	45	45			135	90	118.7	88%		28.7	41.6	OK	
1	AMMAN S NEW	80	80		\square		160	80	131.1	82%	77%	51.1	63.2	OK	
1	ASHRFIA	63	63		t		126	63	108.4	86%		45.4	51.3	ОК	
2	MANARAH	80	80	80			240	160	58.8	24%		0.0	49.0	OK	
2	SAHAB	63	63	63	Ĺ		189	126	145.0	77%	44%	19.0	25.0	OK	
2	MWQAR	80	80		Ì		160	80	55.5	35%		0.0	24.0	OK	
3	ABDALI	40	40	40			120	80	73.8	61%		0.0	18.0	OK	
3	ABDALI NEW	80	80				160	80	86.0	54%		6.0	25.0	OK	
3	HIZAM	80	80	80	-		240	160	126.8	53%	F F 0/	0.0	36.0	OK	
3	ZERQA	30	30	30	40		130	90	100.8	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63					63	0	26.0	41%		26.0	27.0	OK	
3	DHULEIL	80	80				160	80	67.2	42%		0.0	23.1	OK	
4	CITY CENTER	80	80	80			240	160	138.2	58%		0.0	111.6	OK	
4	MARQA	45	63	80			188	108	128.6	68%	59%	20.6	49.5	OK	
4	TAREQ	80	80	80			240	160	130.5	54%		0.0	80.2	OK	
5	BAYADER	80	80	80			240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER	80	80		-		160	80	86.7	54%		6.7	24.0	OK	
5	SALT	80	80				160	80	139.5	87%	78%	59.5	29.5	No	NEPCO Commiitted project
5	UNIVERSITY	80	80	80			240	160	194.9	81%		34.9	85.2	OK	
5	SUBEIHI	63	63	63			189	126	132.9	70%		6.9	5.2	No	
6	QAIA	45	45				90	45	16.0	18%		0.0	24.5	OK	
6	QAIA New		80				160	80	113.1	71%	49%	33.1	24.0	No	
6	MADABA SOUTH	80	80	80			240	160	111.9	47%		0	35.0	OK	
									Avera	ge	60%				

Table 2BSP Analysis by the BSP Grouping Method for JEPCO in 2017

ii) After countermeasures

						Installed	N-1 Capacity	Norma	I State Ar	alysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of TF	₹'s	Capacity	[MVA]	Peak Deman	id 2017 %	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	00	80	80		240	160	149.0	62%	(%)	Observation 0.0	48.0	ОК	
1	AMMAN S		60 45	80 45		135	90	149.0	88%		28.7	46.0	OK	
4	AMMAN S NEW		45 80	45		135	90 80	131.1	82%	77%	51.1	63.2	OK	
1	ANIMAN S NEW		80 63	<u> </u>	$\left \right $	160	63	131.1	82%		45.4	51.3	OK	
2	MANARAH	-	63 80	80		240	160	58.8	24%		45.4	49.0	OK	
	SAHAB		60 63	63		189	126	145.0	77%	44%	19.0	49.0 25.0	OK	
2	MWQAR		63 80	63	\vdash	169	80	55.5	35%	44%	0.0	25.0	OK	
2	ABDALI	40		40		120	80	73.8	61%		0.0	24.0	OK	
3	ABDALI NEW	-	80	40		120	80	86.0	54%		6.0	25.0	OK	
3	HIZAM	80		80		240	160	126.8	53%		0.0	36.0	OK	
3	ZERQA		30	30	40	130	90	120.0	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63		30	40	63	0	26.0	41%		26.0	27.0	OK	
-	DHULEIL		80			160	80	67.2	42%		0.0	27.0	OK	
4	CITY CENTER	_	80	80		240	160	138.2	58%		0.0	111.6	OK	
	MARQA		63	80		188	108	128.6	68%	59%	20.6	49.5	OK	
4	TAREQ	-	80	80		240	160	130.5	54%	0070	0.0	80.2	OK	
5	BAYADER	-	80	80		240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER		80	-		160	80	86.7	54%		6.7	24.0	OK	
	SALT	_	80	80	H	240	160	167.8	70%	72%	7.8	29.5	OK	From Subeihi
5	UNIVERSITY		80	80		240	160	194.9	81%		34.9	85.2	OK	
5	SUBEIHI	63	63	63		189	126	104.6	55%		0.0	5.2	OK	To Salt 15%(28.4MVA)
-	QAIA	_	45			90	45	16.0	18%		0.0	24.5	OK	7
6	QAIA New	80	80			160	80	81.1	51%	49%	1.1	24.0	ОК	To Madaba South 20%(32MVA)
6	MADABA SOUTH	80	80	80		240	160	143.9	60%		0.0	35.0	OK	From QAIA New
-							1	Avera	ae	59%				1

*FUHES, HASHIMYA and MWQAR ND are excluded due to an exclusive use for large industries.

BSP	BSP		No	. of Ti	Pla		Installed Capacity	N-1 Capacity	Norma Peak Deman	State Ar	alysis Group	Load Transfer MVA		<u> </u>	State Analysis
Grouping	(Substation)		140	. 01 11			[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	80	80	80		1	240	160	149.0	62%	(76)	0.0	48.0	ОК	
1	AMMANS	_	45	45			135	90	118.7	88%		28.7	41.6	OK	
1	AMMAN S NEW	80	80		\square		160	80	131.1	82%	77%	51.1	63.2	OK	
1	ASHRFIA	63	63		t		126	63	108.4	86%		45.4	51.3	ОК	
2	MANARAH	80	80	80			240	160	58.8	24%		0.0	49.0	OK	
2	SAHAB	63	63	63	Ĺ		189	126	145.0	77%	44%	19.0	25.0	OK	
2	MWQAR	80	80		Ì		160	80	55.5	35%		0.0	24.0	OK	
3	ABDALI	40	40	40			120	80	73.8	61%		0.0	18.0	OK	
3	ABDALI NEW	80	80				160	80	86.0	54%		6.0	25.0	OK	
3	HIZAM	80	80	80	-		240	160	126.8	53%	F F 0/	0.0	36.0	OK	
3	ZERQA	30	30	30	40		130	90	100.8	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63					63	0	26.0	41%		26.0	27.0	OK	
3	DHULEIL	80	80				160	80	67.2	42%		0.0	23.1	OK	
4	CITY CENTER	80	80	80			240	160	138.2	58%		0.0	111.6	OK	
4	MARQA	45	63	80			188	108	128.6	68%	59%	20.6	49.5	OK	
4	TAREQ	80	80	80			240	160	130.5	54%		0.0	80.2	OK	
5	BAYADER	80	80	80			240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER	80	80		-		160	80	86.7	54%		6.7	24.0	OK	
5	SALT	80	80				160	80	139.5	87%	78%	59.5	29.5	No	NEPCO Commiitted project
5	UNIVERSITY	80	80	80			240	160	194.9	81%		34.9	85.2	OK	
5	SUBEIHI	63	63	63			189	126	132.9	70%		6.9	5.2	No	
6	QAIA	45	45				90	45	16.0	18%		0.0	24.5	OK	
6	QAIA New		80				160	80	113.1	71%	49%	33.1	24.0	No	
6	MADABA SOUTH	80	80	80			240	160	111.9	47%		0	35.0	OK	
									Avera	ge	60%				

Table 3BSP Analysis by the BSP Grouping Method for JEPCO in 2018

ii) After countermeasures

	BSP (Substation)					Installed	N-1 Capacity	Norma	I State Ar	alysis			Contingency	State Analysis
BSP rouping			No	. of TF	₹'s	Capacity	[MVA]	Peak Deman	id 2017 %	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	00	80	80		240	160	149.0	62%	(%)	Observation 0.0	48.0	ОК	
1	AMMAN S		60 45	80 45		135	90	149.0	88%		28.7	46.0	OK	
4	AMMAN S NEW		45 80	45		135	90 80	131.1	82%	77%	51.1	63.2	OK	
1	ANIMAN S NEW		80 63	<u> </u>	$\left \right $	160	63	131.1	82%		45.4	51.3	OK	
2	MANARAH	-	80	80		240	160	58.8	24%		45.4	49.0	OK	
	SAHAB		60 63	63		189	126	145.0	77%	44%	19.0	49.0 25.0	OK	
2	MWQAR		63 80	63	\vdash	169	80	55.5	35%	44%	0.0	25.0	OK	
2	ABDALI	40		40		120	80	73.8	61%		0.0	24.0	OK	
3	ABDALI NEW	-	80	40		120	80	86.0	54%		6.0	25.0	OK	
3	HIZAM	80		80		240	160	126.8	53%		0.0	36.0	OK	
3	ZERQA		30	30	40	130	90	120.0	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63		30	40	63	0	26.0	41%		26.0	27.0	OK	
-	DHULEIL		80			160	80	67.2	42%		0.0	27.0	OK	
4	CITY CENTER	_	80	80		240	160	138.2	58%		0.0	111.6	OK	
	MARQA		63	80		188	108	128.6	68%	59%	20.6	49.5	OK	
4	TAREQ	-	80	80		240	160	130.5	54%	0070	0.0	80.2	OK	
5	BAYADER	-	80	80		240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER		80	-		160	80	86.7	54%		6.7	24.0	OK	
	SALT	_	80	80	H	240	160	167.8	70%	72%	7.8	29.5	OK	From Subeihi
5	UNIVERSITY		80	80		240	160	194.9	81%		34.9	85.2	OK	
5	SUBEIHI	63	63	63		189	126	104.6	55%		0.0	5.2	OK	To Salt 15%(28.4MVA)
-	QAIA	_	45			90	45	16.0	18%		0.0	24.5	OK	7
6	QAIA New	80	80			160	80	81.1	51%	49%	1.1	24.0	ОК	To Madaba South 20%(32MVA)
6	MADABA SOUTH	80	80	80		240	160	143.9	60%		0.0	35.0	OK	From QAIA New
-							1	Avera	ae	59%				1

*FUHES, HASHIMYA and MWQAR ND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity		al State Ar			1	Contingency S	State Analysis
Grouping	(Substation)		No	. of Ti	R's		Capacity		Peak Dema	nd 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						,	[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON		<u> </u>	80			240	160	199.3	83%		39.3	48.0	OK	
1	AMMANS	45	45	45			135	90	106.2	79%	86%	16.2	41.6	OK	
1	AMMAN S NEW	80	80				160	80	149.6	94%	0078	69.6	63.2	No	
1	ASHRFIA	63	63				126	63	113.7	90%		50.7	51.3	OK	
2	MANARAH	80	80	80			240	160	69.1	29%		0.0	49.0	OK	
2	SAHAB	63	63	63			189	126	156.4	83%	49%	30.4	25.0	No	
2	MWQAR	80	80				160	80	63.4	40%		0.0	24.0	OK	
3	ABDALI	40	40	40			120	80	84.1	70%		4.1	18.0	OK	
3	ABDALI NEW	80	80				160	80	98.1	61%		18.1	25.0	OK	
3	HIZAM	80	80	80			240	160	140.7	59%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	1	130	90	86.9	67%	49%	0.0	18.8	OK	
3	ZERQA TR5	63					63	0	16.0	25%		16.0	27.0	OK	
3	New ZERQA	80	80	80			240	160	41.7	17%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	80.3	50%		0.3	23.1	OK	
4	CITY CENTER	80	80	80			240	160	161.5	67%		1.5	111.6	OK	
4	MARQA	45	63	80		1	188	108	132.1	70%	74%	24.1	49.5	OK	
4	TAREQ	80	80	80		1	240	160	197.8	82%		37.8	80.2	OK	
5	BAYADER	80	80	80			240	160	193.1	80%		33.1	79.2	OK	
5	New BAYDER	80	80				160	80	98.9	62%		18.9	24.0	OK	
5	SALT	80	80	80		1	240	160	202.5	84%	78%	42.5	29.5	No	
5	UNIVERSITY	80	80	80	ſ	1	240	160	227.6	95%		67.6	85.2	ОК	
5	Subeihi	63	63	63		1	189	126	111.8	59%		0.0	5.2	ОК	
6	QAIA	45	45		1	1	90	45	19.4	22%		0.0	24.5	OK	
6	QAIA New	80	80		1	1	160	80	98.0	61%	58%	18.0	24.0	ОК	
6	MADABA SOUTH	80	80	80	1	1	240	160	164.4	69%		4.4	35.0	ОК	
		-				,			Avera	iqe	66%				

Table 4BSP Analysis by the BSP Grouping Method for JEPCO in 2019

ii) After countermeasures

							Installed	N-1 Capacity	Norma	I State Ar	alysis			Contingency S	State Analysis
BSP rouping	BSP (Substation)		No	. of Ti	R's		Capacity	ner capacity	Peak Deman	d 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80			240	160	199.3	83%		39.3	48.0	OK	
1	AMMAN S	45	45	45			135	90	106.2	79%	77%	16.2	41.6	OK	
1	AMMAN S NEW	80	80				160	80	117.6	74%	1170	37.6	63.2	OK	To Manara 20%(32MVA)
1	ASHRFIA	63	63				126	63	88.5	70%		25.5	51.3	OK	To Manara 20%(25.2MVA)
2	MANARAH	80	80	80			240	160	126.3	53%		0.0	49.0	OK	From Amman S New and Ashrafia
2	SAHAB	63	63	63			189	126	118.6	63%	59%	0.0	25.0	OK	To Muwaqar 20%(37.8MVA)
2	MWQAR	80	80				160	80	101.2	63%		21.2	24.0	OK	From Sahab
3	ABDALI	40	40	40			120	80	84.1	70%		4.1	18.0	OK	
3	ABDALI NEW	80	80				160	80	98.1	61%		18.1	25.0	OK	
3	HIZAM	80	80	80			240	160	140.7	59%		0.0	36.0	OK	
3	ZERQA	30	30	30	40)	130	90	86.9	67%	49%	0.0	18.8	OK	
3	ZERQA TR5	63					63	0	16.0	25%		16.0	27.0	OK	
3	New ZERQA	80	80	80			240	160	41.7	17%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	80.3	50%		0.3	23.1	OK	
4	CITY CENTER	80	80	80			240	160	185.5	77%		25.5	111.6	OK	From University
4	MARQA	45	63	80			188	108	132.1	70%	77%	24.1	49.5	OK	
4	TAREQ	80	80	80			240	160	197.8	82%		37.8	80.2	OK	
5	BAYADER	80	80	80			240	160	202.7	84%		42.7	79.2	OK	From Salt
5	New BAYDER	80	80				160	80	103.7	65%		23.7	24.0	OK	From Salt
5	SALT	80	80	80			240	160	188.1	78%	76%	28.1	29.5	OK	To Bayader and New Bayader 6%(14.4MV/
5	UNIVERSITY	80	80	80			240	160	203.6	85%		43.6	85.2	OK	To City Center 10%(24MVA)
5	Subeihi	63	63	63			189	126	111.8	59%		0.0	5.2	OK	
6	QAIA	45	45				90	45	19.4	22%		0.0	24.5	OK	
6	QAIA New	80	80				160	80	98.0	61%	58%	18.0	24.0	OK	
6	MADABA SOUTH	80	80	80			240	160	164.4	69%		4.4	35.0	ОК	
									Avera	ae	66%		•		

*FUHES, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity		I State Ar	, <i>`</i>			Contingency S	State Analysis
rouping	(Substation)		No	. of Ti	R's		Capacity		Peak Demar	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						,	[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON		80	80			240	160	209.6	87%		49.6	48.0	No	
1	AMMAN S	-	45	45	L		135	90	111.7	83%	81%	21.7	41.6	OK	
1	AMMAN S NEW	_	80			_	160	80	123.7	77%	0170	43.7	63.2	OK	
1	ASHRFIA	_	63			1	126	63	88.5	70%		25.5	51.3	OK	
2	MANARAH		80	80			240	160	133.0	55%		0.0	49.0	ОК	
2	SAHAB	-	63	63			189	126	121.2	64%	61%	0.0	25.0	OK	
2	MWQAR		80				160	80	107.5	67%		27.5	24.0	No	
3	ABDALI	40	40	40			120	80	88.6	74%		8.6	18.0	OK	
3	ABDALI NEW	80	80				160	80	103.3	65%		23.3	25.0	OK	
3	HIZAM	80	80	80			240	160	148.3	62%		0.0	36.0	OK	
3	ZERQA	30	30	30	40		130	90	91.8	71%	52%	1.8	18.8	OK	
3	ZERQA TR5	63					63	0	16.9	27%		16.9	27.0	OK	
3	New ZERQA	80	80	80			240	160	44.0	18%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	86.2	54%		6.2	23.1	OK	
4	CITY CENTER	80	80	80			240	160	196.0	82%		36.0	111.6	OK	
4	MARQA	45	63	80			188	108	131.4	70%	80%	23.4	49.5	OK	
4	TAREQ	80	80	80			240	160	205.7	86%		45.7	80.2	OK	
5	BAYADER	80	80	80			240	160	213.2	89%		53.2	79.2	OK	
5	New BAYDER	80	80				160	80	109.1	68%		29.1	24.0	No	
5	SALT	80	80	80			240	160	203.8	85%	80%	43.8	29.5	No	
5	UNIVERSITY	80	80	80			240	160	216.3	90%		56.3	85.2	ОК	
5	SUBEIHI	63	63	63			189	126	115.4	61%		0.0	5.2	OK	
6	QAIA	45	45			-	90	45	21.0	23%		0.0	24.5	OK	
6	QAIA New	80	80			1	160	80	106.5	67%	61%	26.5	24.0	No	
6	MADABA SOUTH	80	80	80			240	160	173.4	72%		13.4	35.0	ОК	
									Avera	qe	69%			· · ·	

Table 5BSP Analysis by the BSP Grouping Method for JEPCO in 2020

							Installed	N-1 Capacity	Norma	State Ar	nalysis			Contingency	State Analysis
BSP Fouping	BSP (Substation)		No	. of T	R's		Capacity [MVA]	[MVA]	Peak Deman	id 2020 %	Group Operating rate (%)	Load Transfer MVA Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	80	80	80		1	240	160	190.4	79%	(70)	30.4	48.0	ОК	To Ashrafia 8%(19.2MVA)
1	AMMAN S	_	45	45	1	1	135	90	111.7	83%		21.7	41.6	OK	TO ASTIANA 070(13.2000A)
1	AMMAN S NEW	80	80	-	1	\top	160	80	123.7	77%	81%	43.7	63.2	OK	
1	ASHRFIA	63	63	-	1	1	126	63	107.7	85%		44.7	51.3	ОК	From Abdoon
2	MANARAH	80	80	80			240	160	149.0	62%		0.0	49.0	OK	From Muwagar
2	SAHAB	63	63	63	Ì	1	189	126	121.2	64%	61%	0.0	25.0	OK	
2	MWQAR	80	80				160	80	91.5	57%		11.5	24.0	OK	To Manarah 10%(16MVA)
3	ABDALI	40	40	40	-		120	80	88.6	74%		8.6	18.0	OK	
3	ABDALI NEW	80	80				160	80	103.3	65%		23.3	25.0	OK	
3	HIZAM	80	80	80	Γ		240	160	148.3	62%		0.0	36.0	OK	
3	ZERQA	30	30	30	40)	130	90	91.8	71%	52%	1.8	18.8	OK	
3	ZERQA TR5	63					63	0	16.9	27%		16.9	27.0	OK	
3	New ZERQA	80	80	80			240	160	44.0	18%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	86.2	54%		6.2	23.1	OK	
4	CITY CENTER	80	80	80			240	160	196.0	82%		36.0	111.6	ОК	
4	MARQA	45	63	80			188	108	131.4	70%	80%	23.4	49.5	OK	
4	TAREQ	80	80	80			240	160	205.7	86%		45.7	80.2	OK	
5	BAYADER		80	80	-		240	160	198.8	83%		38.8	79.2	OK	
5	New BAYDER	_	80	80			240	159	181.1	75%		22.1	36.0		Addition of 80MVA transformer
5	SALT	80	80	80			240	160	167.8	70%	75%	7.8	29.5	OK	
5	UNIVERSITY	80	80	80			240	160	194.7	81%		34.7	85.2	OK	
5	Subeihi		63	63			189	126	115.4	61%		0.0	5.2	OK	
6	QAIA	45	45				90	45	21.0	23%		0.0	24.5	OK	
6	QAIA New		80	80			240	80	106.5	44%	53%	26.5	36.0	OK	Addition of 80MVA transformer
6	MADABA SOUTH	80	80	80			240	160	173.4	72%		13.4	35.0	OK	
									Avera	ge	67%				

*FUHES, HASHIMIYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity		al State Ar	, ´			Contingency S	State Analysis
ouping	(Substation)		No	. of Ti	R's		Capacity		Peak Dema	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON		80	80	L		240	160	204.5	85%		44.5	48.0	ОК	
1	AMMANS		45	45	_		135	90	119.7	89%	86%	29.7	41.6	OK	
1	AMMAN S NEW		80		_		160	80	132.6	83%	0070	52.6	63.2	OK	
1	ASHRFIA	_	63				126	63	110.7	88%		47.7	51.3	OK	
2	MANARAH	80	80	80			240	160	162.5	68%		2.5	49.0	OK	
2	SAHAB	63	63	63			189	126	126.4	67%	66%	0.4	25.0	ОК	
2	MWQAR	80	80				160	80	96.9	61%		16.9	24.0	OK	
3	ABDALI	40	40	40			120	80	95.2	79%		15.2	18.0	ОК	
3	ABDALI NEW	80	80				160	80	110.9	69%		30.9	25.0	No	
3	HIZAM	80	80	80			240	160	156.2	65%		0.0	36.0	OK	
3	ZERQA	30	30	30	40		130	90	98.2	76%	56%	8.2	18.8	OK	
3	ZERQA TR5	63					63	0	18.1	29%		18.1	27.0	OK	
3	New ZERQA	80	80	80			240	160	47.1	20%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	93.5	58%		13.5	23.1	OK	
4	CITY CENTER	80	80	80			240	160	212.4	88%		52.4	111.6	OK	
4	MARQA	45	63	80		1	188	108	133.5	71%	85%	25.5	49.5	OK	
4	TAREQ	80	80	80		1	240	160	219.1	91%		59.1	80.2	OK	
5	BAYADER	80	80	80			240	160	213.1	89%		53.1	79.2	OK	
5	New BAYDER	80	80	80			240	160	194.1	81%		34.1	36.0	OK	
5	SALT	80	80	80		1	240	160	185.1	77%	80%	25.1	29.5	ОК	
5	UNIVERSITY	80	80	80		1	240	160	210.3	88%	1	50.3	85.2	ОК	
5	Subeihi	63	63	63	1	1	189	126	119.0	63%	1	0.0	5.2	ОК	
6	QAIA	45	45			1	90	45	23.1	26%		0.0	24.5	OK	
6	QAIA New	80	80	80	1	1	240	160	117.0	49%	57%	0.0	36.0	ОК	
6	MADABA SOUTH	80	80	80	1	1	240	160	186.2	78%		26.2	35.0	ОК	
						,	1		Avera	ae	72%		1	· · · · · · ·	

Table 6BSP Analysis by the BSP Grouping Method for JEPCO in 2021

ii) After countermeasures

							Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of T	R's		Capacity [MVA]	[MVA]	Peak Deman	id 2021 %	Group Operating rate (%)	Load Transfer MVA Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	80	80	80	1	1	240	160	204.5	85%	(76)	44.5	48.0	ОК	
1	AMMANS	_	45	45			135	90	119.7	89%		29.7	41.6	OK	
1	AMMAN S NEW		80	40	-	+	160	80	132.6	83%	86%	52.6	63.2	OK	
1	ASHRFIA		63		-	+	126	63	110.7	88%		47.7	51.3	OK	
2	MANARAH	_	80	80			240	160	162.5	68%		2.5	49.0	OK	
2	SAHAB	63	63	63	1	1	189	126	126.4	67%	66%	0.4	25.0	OK	
2	MWQAR	80	80				160	80	96.9	61%		16.9	24.0	ОК	
3	ABDALI	40	40	40		1	120	80	95.2	79%		6.1	43.0	OK	Linkling of 33kV buses of Abdali and Abdali Ne
3	ABDALI NEW	80	80				160	80	110.9	69%					
3	HIZAM	80	80	80	İ		240	160	156.2	65%		0.0	36.0	OK	
3	ZERQA	30	30	30	4()	130	90	98.2	76%	56%	8.2	18.8	OK	
3	ZERQA TR5	63			Ì		63	0	18.1	29%		18.1	27.0	OK	
3	New ZERQA	80	80	80			240	160	47.1	20%		0.0	36.0	OK	
3	DHULEIL	80	80				160	80	93.5	58%		13.5	23.1	OK	
4	CITY CENTER	80	80	80			240	160	212.4	88%		52.4	111.6	OK	
4	MARQA	45	63	80			188	108	157.3	84%	85%	49.3	49.5	OK	From Tareq
4	TAREQ	80	80	80	-		240	160	195.4	81%		35.4	80.2	OK	To Marqa 10%(23.8MVA)
5	BAYADER	80	80	80	_		240	160	213.1	89%		53.1	79.2	OK	
5	New BAYDER	80	80	80			240	160	194.1	81%		34.1	36.0	OK	
5	SALT	80	80	80	-		240	160	185.1	77%	80%	25.1	29.5	OK	
5	UNIVERSITY	80	80	80			240	160	210.3	88%		50.3	85.2	OK	
5	Subeihi	63	63	63			189	126	119.0	63%		0.0	5.2	OK	
6	QAIA	45					90	45	23.1	26%		0.0	24.5	OK	
6	QAIA New		80	80			240	160	117.0	49%	57%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	-		240	160	186.2	78%		26.2	35.0	OK	
									Avera	ge	72%				

*FUHES, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity		I State Ar	, <i>`</i>			Contingency St	ate Analysis
Grouping	(Substation)		No	. of Ti	R's		Capacity		Peak Demar		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
					,	,	[MVA]	[MVA]	[MVA]	%	(%)	Observation			
1	ABDOON		80	80	0	0	240	160	213.9	89%		53.9	48.0	No	
1	AMMAN S		45	45	0	0	135	90	125.2	93%	89%	35.2	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0	160	80	138.6	87%	0070	58.6	63.2	OK	
1	ASHRFIA	63	63	0	0	0	126	63	110.7	88%		47.7	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	171.6	71%		11.6	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	128.1	68%	68%	2.1	25.0	OK	
2	MWQAR	80	80	0	0	0	160	80	102.3	64%		22.3	24.0	OK	
3	ABDALI	40	40	40	0	0	120	80	99.3	83%		15.1	43.0	ОК	
3	ABDALI NEW	80	80	0	0	0	160	80	115.8	72%					
3	HIZAM	80	80	80	0	0	240	160	164.5	69%]	4.5	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	102.5	79%	58%	12.5	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	18.9	30%	1	18.9	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	49.2	20%		0.0	36.0	ОК	
3	DHULEIL	80	80	0	0	0	160	80	100.8	63%		20.8	23.1	ОК	
4	CITY CENTER	80	80	80	0	0	240	160	224.0	93%		64.0	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	156.5	83%	87%	48.5	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	202.4	84%		42.4	80.2	ОК	
5	BAYADER	80	80	80	0	0	240	160	222.9	93%		62.9	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	203.0	85%		43.0	36.0	No	
5	SALT	80	80	80	0	0	240	160	198.7	83%	84%	38.7	29.5	No	
5	UNIVERSITY	80	80	80	0	0	240	160	221.8	92%		61.8	85.2	ОК	
5	SUBEIHI	-	63	63	0	0	189	126	122.6	65%		0.0	5.2	ОК	
6	QAIA	-	45	0	0	0	90	45	24.9	28%		0.0	24.5	OK	
6	QAIA New	-	80	80	0	0	240	160	126.2	53%	61%	0.0	36.0	ОК	
6	MADABA SOUTH		80	80	0	0	240	160	194.0	81%		34.0	35.0	ОК	
					1	3			Avera	ae	75%				

Table 7BSP Analysis by the BSP Grouping Method for JEPCO in 2022

ii) After countermeasures

									Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)			No	o. of	f TR'			Capacity	Ner Gapacity	Peak Demar	nd 2022	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	()								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	ABDOON	8	0	80	8	80	0	0	240	160	165.9	69%		5.9	48.0	OK	
1	AMMAN S	4	5	45	4	15	0	0	135	90	98.2	73%		8.2	41.6	OK	
1	AMMAN S NEW	8	0	80	(0	0	0	160	80	114.6	72%	65%	34.6	63.2	OK	
1	New BSP	8	0	80	8	80			240	160	117.9	49%		0.0	36.0	OK	New BSP
1	ASHRFIA	6	3	63	(0	0	0	126	63	91.8	73%		28.8	51.3	OK	
2	MANARAH	8	0	80	8	80	0	0	240	160	171.6	71%		11.6	49.0	OK	
2	SAHAB	6	3	63	6	63	0	0	189	126	128.1	68%	68%	2.1	25.0	OK	
2	MWQAR	8	0	80	(0	0	0	160	80	102.3	64%		22.3	24.0	OK	
3	ABDALI	4	0	40	4	10	0	0	120	80	99.3	83%		15.1	43.0	OK	
3	ABDALI NEW	8	0	80	(0	0	0	160	80	115.8	72%					
3	HIZAM	8	0	80	8	80	0	0	240	160	164.5	69%		4.5	36.0	OK	
3	ZERQA	3	0	30	3	80	40	0	130	90	102.5	79%	58%	12.5	18.8	OK	
3	ZERQA TR5	6	3	0	(0	0	0	63	0	18.9	30%		18.9	27.0	OK	
3	New ZERQA	8	0	80	8	80	0	0	240	160	49.2	20%		0.0	36.0	OK	
3	DHULEIL	8	0	80	0	0	0	0	160	80	100.8	63%		20.8	23.1	OK	
4	CITY CENTER	8	0	80	8	80	0	0	240	160	212.0	88%		52.0	111.6	OK	To Tareq 5% (12MVA)
4	MARQA	4	5	63	8	80	0	0	188	108	156.5	83%	87%	48.5	49.5	OK	
4	TAREQ	8	0	80	8	80	0	0	240	160	214.4	89%		54.4	80.2	OK	From City Center
5	BAYADER	8	0	80	8	80	0	0	240	160	174.9	73%		14.9	79.2	OK	To New BSP
5	New BAYDER	8	0	80	8	80	0	0	240	160	167.0	70%		7.0	36.0	OK	To New BSP
5	SALT	8	0	80	8	80	0	0	240	160	167.5	70%	70%	7.5	29.5	OK	To New BSP
5	UNIVERSITY	8	0	80	8	80	0	0	240	160	173.8	72%	10%	13.8	85.2	OK	To New BSP
5	New BSP	8	0	80	8	80			240	160	163.2	68%		3.2	36.0	OK	New BSP
5	Subeihi	6	3	63	6	63	0	0	189	126	122.6	65%		0.0	29.5	OK	
6	QAIA	4	5	45	(0	0	0	90	45	24.9	28%		0.0	24.5	OK	
6	QAIA New	8	0	80	8	80	0	0	240	160	126.2	53%	61%	0.0	36.0	OK	
6	MADABA SOUTH	8	0	80	8	80	0	0	240	160	194.0	81%		34.0	35.0	OK	
											Avera	ge	68%				

*FUHEIS, HASHIMIYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity		I State Ar	, <i>`</i>			Contingency St	ate Analysis
rouping	(Substation)		No	. of T	R's		Capacity		Peak Demar		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
			,		,	2	[MVA]	[MVA]	[MVA]	%	(%)	Observation			
1	ABDOON	-	80	80	÷	<u> </u>	240	160	176.9	74%		16.9	48.0	OK	
1	AMMANS	-	45	45	+	0	135	90	105.2	78%		15.2	41.6	OK	
1	AMMAN S NEW		80	0	0	0		80	122.8	77%	69%	42.8	63.2	OK	
1	New BSP		80	80	0	0	240	160	126.4	53%		0.0	36.0	OK	
1	ASHRFIA		63	0	0	0	126	63	94.3	75%		31.3	51.3	OK	
2	MANARAH		80	80	0	0	240	160	185.1	77%		25.1	49.0	OK	
2	SAHAB		63	63	0	0	189	126	133.3	71%		7.3	25.0	OK	
2	MWQAR	80	80	0	0	0	160	80	107.7	67%		27.7	24.0	No	
3	ABDALI	40	40	40	0	0	120	80	106.5	89%		30.8	43.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	124.2	78%					
3	HIZAM	80	80	80	0	0	240	160	173.3	72%		13.3	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	110.0	85%	63%	20.0	18.8	No	
3	ZERQA TR5	63	0	0	0	0	63	0	20.3	32%		20.3	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	52.8	22%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	109.5	68%		29.5	23.1	No	
4	CITY CENTER	80	80	80	0	0	240	160	229.7	96%		69.7	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	159.0	85%	92%	51.0	49.5	No	
4	TAREQ	80	80	80	0	0	240	160	227.1	95%		67.1	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	187.3	78%		27.3	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	178.9	75%		18.9	36.0	OK	
5	SALT	80	80	80	0	0	240	160	184.7	77%		24.7	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	188.0	78%	75%	28.0	85.2	OK	
5	New BSP	80	80	80	0	0	240	160	176.5	74%		16.5	36.0	OK	
5	Subeihi	63	63	63	0	0	189	126	129.8	69%	1	3.8	29.5	OK	
6	QAIA	45	45	0	0	0	90	45	27.4	30%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	138.9	58%	66%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	208.1	87%		48.1	35.0	No	
-					2	\$			Avera	ae	73%	-			

Table 8BSP Analysis by the BSP Grouping Method for JEPCO in 2023

ii) After countermeasures

							Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of T	R's		Capacity	iter capacity	Peak Demar	nd 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansier between BSFS
1	ABDOON	80	80	80	0	0	240	160	176.9	74%		16.9	48.0	OK	
1	AMMAN S	45	45	45	0	0	135	90	105.2	78%		15.2	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0	160	80	122.8	77%	69%	42.8	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	126.4	53%		0.0	36.0	OK	
1	ASHRFIA	63	63	0	0	0	126	63	94.3	75%		31.3	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	173.1	72%		13.1	49.0	OK	To Mwaqar
2	SAHAB	63	63	63	0	0	189	126	133.3	71%	64%	7.3	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	119.7	50%		0.0	36.0	OK	Addition of 80MVA transformer
3	ABDALI	40	40	40	0	0	120	80	106.5	89%		30.8	43.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	124.2	78%					
3	HIZAM	80	80	80	0	0	240	160	173.3	72%		13.3	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	110.0	85%	63%	24.3	45.8	OK	Linkling of 33kV buses of Zarqa and Zarqa T
3	ZERQA TR5	63	0	0	0	0	63	0	44.3	70%					From Dhuleil
3	New ZERQA	80	80	80	0	0	240	160	52.8	22%		0.0	36.0	OK]
3	DHULEIL	80	80	0	0	0	160	80	85.5	53%		5.5	23.1	OK	To Zerqa TR5 15%(24MVA)
4	CITY CENTER	80	80	80	0	0	240	160	181.7	76%		21.7	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	130.8	70%	68%	22.8	49.5	OK	
4	New BSP	80	80	80			240	160	112.2	47%	68%	0.0	36.0	OK	New BSP
4	TAREQ	80	80	80	0	0	240	160	191.1	80%		31.1	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	187.3	78%		27.3	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	178.9	75%		18.9	36.0	OK	
5	SALT	80	80	80	0	0	240	160	184.7	77%	75%	24.7	29.5	OK]
5	UNIVERSITY	80	80	80	0	0	240	160	188.0	78%	/5%	28.0	85.2	OK]
5	New BSP	80	80	80	0	0	240	160	176.5	74%		16.5	36.0	OK]
5	Subeihi	63	63	63	0	0	189	126	129.8	69%		3.8	29.5	OK	
6	QAIA	45	45	0	0	0	90	45	27.4	30%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	167.7	70%	66%	7.7	36.0	OK	From Madaba south
6	MADABA SOUTH	80	80	80	0	0	240	160	179.3	75%		19.3	35.0	OK	To QAIA New
							•		Avera	qe	67%			•	•

i) No co	ountermeasu	ire				_									
BSP	BSP						Installed	N-1 Capacity	Norma	I State Ar	, ´		1	Contingency S	tate Analysis
Grouping	(Substation)		No	of T	'R's		Capacity		Peak Dema	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1		N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON	80	80	80	0	0	240	160	189.6	79%		29.6	48.0	ОК	
1	AMMAN S	45	45	45	0	0	135	90	112.8	84%		22.8	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0	160	80	131.7	82%	74%	51.7	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	135.4	56%		0.0	36.0	OK	
1	ASHRFIA	63	63	0	0	0	126	63	96.8	77%		33.8	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	187.2	78%		27.2	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	138.5	73%	68%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	128.7	54%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	113.8	95%		46.4	43.0	No	
3	ABDALI NEW	80	80	0	0	0	160	80	132.7	83%					
3	HIZAM	80	80	80	0	0	240	160	182.6	76%		22.6	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	117.5	90%	67%	34.8	45.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	47.3	75%					
3	New ZERQA	80	80	80	0	0	240	160	56.4	23%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	93.5	58%		13.5	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	196.5	82%		36.5	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	132.8	71%	71%	24.8	49.5	OK	
4	New BSP	80	80	80	0	0	240	160	114.0	47%	/170	0.0	36.0	OK	
4	TAREQ	80	80	80	0	0	240	160	202.7	84%		42.7	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	200.3	83%		40.3	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	191.3	80%		31.3	36.0	OK	
5	SALT	80	80	80	0	0	240	160	203.4	85%	80%	43.4	29.5	No	
5	UNIVERSITY	80	80	80	0	0	240	160	203.5	85%	00%	43.5	85.2	OK	
5	NEW BSP	80	80	80	0	0	240	160	181.4	76%		21.4	36.0	OK	
5	Subeihi	63	63	63	0	0	189	126	133.4	71%		7.4	29.5	OK	
6	QAIA	45	45	0	0	0	90	45	30.2	34%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	184.7	77%	71%	24.7	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	192.6	80%		32.6	35.0	OK	
-									Avera	ge	72%			· · · · · ·	

Table 9BSP Analysis by the BSP Grouping Method for JEPCO in 2024

*FUHES, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

ii) After countermeasures

							Installed	N-1 Capacity	Norma	I State Ar	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of Ti	R's		Capacity	N=1 Capacity	Peak Deman	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80	0	0	240	160	189.6	79%		29.6	48.0	OK	
1	AMMAN S	45	45	45	0	0	135	90	112.8	84%		22.8	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0	160	80	131.7	82%	74%	51.7	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	135.4	56%		0.0	36.0	OK	
1	ASHRFIA	63	63	0	0	0	126	63	96.8	77%		33.8	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	187.2	78%		27.2	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	138.5	73%	68%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	128.7	54%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	101.8	85%		40.4	43.0	OK	To Hizam and Abdali New 10%(12MVA
3	ABDALI NEW	80	80		0	0	160	80	138.7	87%					From Abdali
3	HIZAM	80	80	80	0	0	240	160	188.6	79%		28.6	36.0	OK	From Abdali
3	ZERQA	30	30	30	40	0	130	90	111.0	85%	67%	34.8	45.8	OK	To ZerqaTR5 5%(6.5MVA)
3	ZERQA TR5	63	0	0	0	0	63	0	53.8	85%					
3	New ZERQA	80	80	80	0	0	240	160	56.4	23%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	93.5	58%		13.5	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	196.5	82%		36.5	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	132.8	71%	71%	24.8	49.5	OK	
4	New BSP	80	80	80	0	0	240	160	114.0	47%	/1/0	0.0	36.0	OK	
4	TAREQ	80	80	80	0	0	240	160	202.7	84%		42.7	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	200.3	83%		40.3	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	191.3	80%		31.3	36.0	OK	
5	SALT	80	80	80	0	0	240	160	167.4	70%	77%	7.4	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	203.5	85%	1170	43.5	85.2	OK]
5	NEW BSP	80	80	80	0	0	240	160	181.4	76%		21.4	36.0	OK	
5	Subeihi	80	80	80	0	0	240	160	169.4	71%		9.4	29.5	OK	Reinforcement(189→240MVA)
6	QAIA	45	45	0	0	0	90	45	30.2	34%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	184.7	77%	71%	24.7	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	192.6	80%		32.6	35.0	OK	
	•						•		Avera	qe	71%		•		•

*FUHEIS, HASHIMIYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity	Norma	al State Ar				Contingency S	State Analysis
BSP	BSP (Substation)		No	. of Ti	ל's		Capacity	in Capacity	Peak Dema	nd 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Hansiel between BSFS
1	ABDOON	80	80	80	0	0	240	160	197.9	82%		37.9	48.0	OK	
1	AMMAN S	45	45	45	0	0	135	90	117.5	87%	,	27.5	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0	160	80	137.2	86%	77%	57.2	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	141.2	59%	,	0.0	36.0	OK	
1	ASHRFIA	63	63	0	0	0	126	63	96.8	77%	,	33.8	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	197.0	82%	,	37.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	141.1	75%	71%	15.1	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	134.7	56%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	106.4	89%		26.4	18.0	No	
3	ABDALI NEW	80	80	0	0	0	160	80	145.0	91%	•	65.0	25.0	No	
3	HIZAM	80	80	80	0	0	240	160	198.6	83%		38.6	36.0	No	
3	ZERQA	30	30	30	40	0	130	90	116.1	89%	70%	42.3	45.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	56.2	89%					
3	New ZERQA	80	80	80	0	0	240	160	58.9	25%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	99.2	62%		19.2	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	207.0	86%		47.0	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	130.8	70%	73%	22.8	49.5	OK	
4	New BSP	80	80	80			240	160	117.5	49%	13/0	0.0	36.0	OK	
4	TAREQ	80	80	80	0	0	240	160	209.0	87%		49.0	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	209.2	87%		49.2	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	199.8	83%		39.8	36.0	No	
5	SALT	80	80	80	0	0	240	160	179.4	75%	81%	19.4	39.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	214.4	89%	0170	54.4	85.2	OK	
5	NEW BSP	80	80	80			240	160	191.2	80%		31.2	36.0	OK	
5	Subeihi	80	80	80	0	0	240	160	174.0	72%	,	14.0	39.5	OK	
6	QAIA	45	45	0	0	0	90	45	32.5	36%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	198.3	83%	76%	38.3	36.0	No	
6	MADABA SOUTH	80	80	80	0	0	240	160	200.3	83%		40.3	35.0	No	
	-								Avera	ige	75%				

Table 10BSP Analysis by the BSP Grouping Method for JEPCO in 2025

ii) After countermeasures

BSP	BSP							nstalled	N-1 Capacity	Norma	I State Ar			1	Contingency	State Analysis
ouping	BSP (Substation)		No	. of T	R's		C	apacity	N i oupuony	Peak Demar	nd 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transier between DOF 3
1	ABDOON	80	80	80	0	0)	240	160	197.9	82%		37.9	48.0	OK	
1	AMMAN S	45	45	45	0	0)	135	90	117.5	87%		27.5	41.6	OK	
1	AMMAN S NEW	80	80	0	0	0)	160	80	137.2	86%	77%	57.2	63.2	OK	
1	New BSP	80	80	80	0	0		240	160	141.2	59%		0.0	36.0	OK	
1	ASHRFIA	63	63	0	0	0)	126	63	96.8	77%		33.8	51.3	OK	
2	MANARAH	80	80	80	0	0)	240	160	197.0	82%		37.0	49.0	OK	
2	SAHAB	63	63	63	0	0)	189	126	141.1	75%	71%	15.1	25.0	OK	
2	MWQAR	80	80	80	0	0)	240	160	134.7	56%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0)	120	80	94.4	79%		14.4	18.0	OK	To Abdali New
3	ABDALI NEW	80	80	80	0	0)	240	160	181.0	75%		21.0	25.0	OK	Addition of 80MVA transformer
3	HIZAM	80	80	80	0	0)	240	160	174.6	73%		14.6	36.0	OK	To Abdali New
3	ZERQA	30	30	30	40	0)	130	90	116.1	89%	65%	42.3	45.8	OK	
3	ZERQA TR5	63	0	0	0	0)	63	0	56.2	89%					
3	New ZERQA	80	80	80	0	0)	240	160	58.9	25%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0)	160	80	99.2	62%		19.2	23.1	OK	
4	CITY CENTER	80	80	80	0	0)	240	160	207.0	86%		47.0	111.6	OK	
4	MARQA	45	63	80	0	0)	188	108	130.8	70%	73%	22.8	49.5	OK	
4	New BSP	80	80	80	0	0)	240	160	117.5	49%	1370	0.0	36.0	OK	
4	TAREQ	80	80	80	0	0)	240	160	209.0	87%		49.0	80.2	OK	
5	BAYADER	80	80	80	0	0)	240	160	209.2	87%		8.9	115.2	OK	
5	New BAYDER	80	80	80	0	0)	240	160	199.8	83%					
5	SALT	80	80	80	0	0)	240	160	179.4	75%	81%	19.4	29.5	OK	
5	UNIVERSITY	80	80	80	0	0)	240	160	214.4	89%	01/0	54.4	85.2	OK	
5	NEW BSP	80	80	80	0	0)	240	160	191.2	80%		31.2	36.0	OK	
5	Subeihi	80	80	80	0	0)	240	160	174.0	72%		14.0	29.5	OK	
6	QAIA	45	45	80	0	0)	170	90	80.5	47%		0.0	24.5	OK	Addition of 80MVA transformer
6	QAIA New	80	80	80	0	0)	240	160	174.3	73%	66%	14.3	36.0	OK	To QAIA
6	MADABA SOUTH	80	80	80	0	0)	240	160	176.3	73%		16.3	35.0	OK	To QAIA
										Avera	ge	72%				

							Installed		Norma	al State Ana	alysis		Co	ntingency State A	nalysis
BSP rouping	BSP (Substation)		No	. of 1	'R's		Capacity	N-1 Capacity	Peak Deman	nd 2016	Group	Load Transfer MVA	Possible Load	N-1 Observation	Load Transfer between BSPs
rouping	(oubotation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63		206	143	69.7	34%		0.0	25.0	OK	
1	AQ IND	80	80				160	80	31.7	20%	23%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80		286	206	46.3	16%		0.0	10.0	ОК	
2	QUWEIRA	16	45				61	16	16.0	26%	27%	0.0	6.0	OK	
2	DESI	63	63				126	63	34.5	27%	21%	0.0	6.0	OK	
3	EL_HASA	25	25				50	25	25.9	52%	39%	0.9	5.0	ОК	
3	RASHADIA	16	40	40			96	56	31.0	32%	39%	0.0	5.0	OK	
4	KARAK	16	16	25			57	32	45.4	80%	34%	13.4	10.0	No	
4	KARAK SOUTH	80	80				160	80	28.9	18%	34 %	0.0	10.0	ОК	
5	SUBEIHI	63	63	63			189	126	122.1	65%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80			240	160	78.7	33%	55%	0.0	3.0	ОК	
5	ISHTAFINA	40	45				85	40	67.8	80%	55%	27.8	3.0	No	
5	WAQAS	63	63				126	63	85.1	68%		22.1	3.0	No	
99	QATRANA	10	10	16			36	20	19.7	55%	55%	0.0	0.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	60.4	30%	30%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	50.6	29%	29%	0.0	0.0	OK	
99	AZRAQ	25	25				50	25	16.2	32%	32%	0.0	0.0	OK	
99	SAFAWI	10					10	0	6.2	62%	62%	6.2	0.0	No	
99	RWESHID	10					10	0	4.3	43%	43%	4.3	0.0	No	
99	RESHA	12.5	12.5				25	12.5	3.8	15%	15%	0.0	0.0	OK	
									Avera	ae	37%				

Table 11BSP Analysis by the BSP Grouping Method for EDCO in 2016

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP rouping	BSP (Substation)		No	. of '	TR's		Capacity	N-1 Capacity	Peak Demar	nd 2016	Group	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
. ouping	(oubotation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	AQ A2	40	40	63	63	5	206	143	69.7	34%		0.0	25.0	OK	
1	AQ IND	80	80		_		160	80	31.7	20%	23%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80)	286	206	46.3	16%		0.0	10.0	OK	
2	QUWEIRA	16	45				61	16	16.0	26%	27%	0.0	6.0	OK	
2	DESI	63	63				126	63	34.5	27%	21 70	0.0	6.0	OK	
3	EL_HASA	25	25				50	25	25.9	52%	39%	0.9	5.0	OK	
3	RASHADIA	16	40	40			96	56	31.0	32%	39%	0.0	5.0	OK	
4	KARAK	16	16	25	5		57	32	35.4	62%	34%	3.4	10.0	ОК	To Karak South 17.5%(10MVA
4	KARAK SOUTH	80	80				160	80	38.8	24%	3478	0.0	10.0	OK	From Karak
5	SUBEIHI	-		63	<u> </u>		189	126	122.1	65%		0.0	6.0	ОК	
5	SWEIMEH	_		80			240	160	78.7	33%	50%	0.0	3.0	OK	
5	ISHTAFINA	40		63	<mark>.</mark>		148	85	67.8	46%	50 %	0.0	3.0	ОК	NEPCO Committed Project
5	WAQAS	63	63				126	63	85.1	68%		22.1	3.0	No	NEPCO Committed Project
99	QATRANA	10	10	16	1		36	20	19.7	55%	55%	0.0	0.0	ОК	
99	GHORSAFI	40		40) 40	40	200	160	60.4	30%	30%	0.0	0.0	OK	
99	MAAN	16		16	63	63	174	111	50.6	29%	29%	0.0	0.0	OK	
99	AZRAQ	25	25				50	25	16.2	32%	32%	0.0	0.0	OK	
99	SAFAWI	10					10	0	6.2	62%	62%	6.2	0.0	No	NEPCO Committed Project
99	RWESHID	10					10	0	4.3	43%	43%	4.3	0.0	No	NEPCO Committed Project
99	RESHA	12.5	12.5				25	12.5	3.8	15%	15%	0.0	0.0	OK	
									Avera	ge	37%				

Table 12	BSP Analysis by the	BSP Grouping Method for EDCO in 2017

							Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Grouping	BSP (Substation)		No	. of T	'R's		Capacity	NºT Capacity	Peak Deman	id 2017	Group	Load Transfer MVA	Possible Load	N-1 Observation	Load Transfer between BSPs
arouping	(Cubotation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	5	206	143	73.5	36%		0.0	25.0	ОК	
1	AQ IND	80	80				160	80	33.4	21%	24%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80)	286	206	48.7	17%		0.0	10.0	ОК	
2	QUWEIRA	16	45				61	16	16.9	28%	28%	0.9	6.0	ОК	
2	DESI	63	63				126	63	36.4	29%	28%	0.0	6.0	ОК	
3	EL_HASA	25	25				50	25	27.3	55%	41%	2.3	5.0	ОК	
3	RASHADIA	16	40	40			96	56	32.6	34%	41%	0.0	5.0	OK	
4	KARAK	16	16	25			57	32	37.3	65%	36%	5.3	10.0	ОК	
4	KARAK SOUTH	80	80				160	80	40.9	26%	30%	0.0	10.0	ОК	
5	SUBEIHI	63	63	63			189	126	128.6	68%		2.6	6.0	ОК	
5	SWEIMEH	80	80	80			240	160	82.9	35%	53%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63			148	85	71.4	48%	53%	0.0	3.0	ОК	
5	WAQAS	63	63				126	63	89.6	71%		26.6	3.0	No	
99	QATRANA	10	10	16			36	20	20.8	58%	55%	0.8	0.0	No	
99	GHORSAFI	40	40	40	40	40	200	160	63.6	32%	30%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	53.3	31%	31%	0.0	0.0	ОК	
99	AZRAQ	25	25				50	25	17.1	34%	34%	0.0	0.0	ОК	
99	SAFAWI	10					10	0	6.5	65%	65%	6.5	0.0	No	
99	RWESHID	10					10	0	4.5	45%	45%	4.5	0.0	No	
99	RESHA	12.5	12.5				25	12.5	4.0	16%	16%	0.0	0.0	ОК	
			_						Avera	ae	38%				

								Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	Analysis
BSP rouping	BSP (Substation)		No	. of	TR's			Capacity	Nº1 Capacity	Peak Demar	nd 2017	Group	Load Transfer MVA	Possible Load	N-1 Observation	
souping	(Substation)							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	6	3 6	3		206	143	73.5	36%		0.0	25.0	OK	
1	AQ IND	80	80		Τ			160	80	33.4	21%	24%	0.0	15.0	OK]
1	AQTH & NEW	63	63	8	0 8	0		286	206	48.7	17%		0.0	10.0	OK]
2	QUWEIRA	16	45					61	16	16.9	28%	28%	0.9	6.0	OK	
2	DESI	63	63					126	63	36.4	29%	20%	0.0	6.0	OK	
3	EL_HASA	25	25		_			50	25	27.3	55%	0%	2.3	5.0	OK	
3	RASHADIA	16	40	4	0			96	56	32.6	34%	0%	0.0	5.0	OK	
4	KARAK	16	16	2	5			57	32	37.3	65%	39%	5.3	10.0	OK	
4	KARAK SOUTH	80	80					160	80	50.9	32%	39%	0.0	20.0	OK	From Qatrana
5	SUBEIHI	63	63	6	3			189	126	128.6	68%		2.6	6.0	OK	
5	SWEIMEH	80	80	8	0			240	160	82.9	35%	49%	0.0	3.0	OK	
5	ISHTAFINA	40	45	6	3			148	85	71.4	48%	4370	0.0	3.0	OK	
5	WAQAS	63	63	6	3			189	126	89.6	47%		0.0	3.0	OK	NEPCO Committed Project
4	QATRANA	10	10	1	6			36	20	10.8	30%		0.0	10.0	OK	New Distribution line to Karak Sou
99	GHORSAFI	40	40	4	0 4	04	0	200	160	63.6	32%	32%	0.0	0.0	OK	
99	MAAN	16	16	1	66	36	3	174	111	53.3	31%	31%	0.0	0.0	OK]
99	AZRAQ	25	25					50	25	17.1	34%	34%	0.0	0.0	OK]
99	SAFAWI	10	10					20	10	6.5	32%	32%	0.0	0.0	OK	NEPCO Committed Project
99	RWESHID	10	10					20	10	4.5	23%	23%	0.0	0.0	OK	NEPCO Committed Project
99	RESHA	12.5	12.5					25	12.5	4.0	16%	16%	0.0	0.0	OK	
										Avera	ge	28%			•	•

Table 13	BSP Analysis by the BSP Grouping Method for EDCO in 2018

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP	BSP (Substation)		No	of '	ſR's		Capacity	a capacity	Peak Demar	nd 2018	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	()						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	6	3	206	143	77.4	38%		0.0	25.0	ОК	
1	AQ IND	80	80				160	80	35.2	22%	25%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	8	ו	286	206	51.3	18%		0.0	10.0	OK	
2	QUWEIRA	16					61	16	17.8	29%	30%	1.8	6.0	ОК	
2	DESI	63	63				126	63	38.3	30%	3078	0.0	6.0	ОК	
3	EL_HASA	-	25				50	25	28.7	57%	43%	3.7	5.0	ОК	
3	RASHADIA	16	_	40	-		96	56	34.4	36%	1070	0.0	5.0	ОК	
4	KARAK			25			57	32	39.3		41%	7.3	10.0	ОК	
4		80	_				160	80	53.6			0.0	20.0	ОК	
-		63	_	63		_	189	126	135.5			9.5	6.0	No	
5	SWEIMEH	80	_	80	+		240	160	87.3		51%	0.0	3.0	ОК	
5	ISHTAFINA	40	_	63	+		148	85	75.3			0.0	3.0	ОК	
5	WAQAS	63	_	63	-		189	126	94.4			0.0	3.0	ОК	
4	QATRANA	10	_	16	-		36	20	11.4		-	0.0	10.0	ОК	
	GHORSAFI	40	_	40	-	-		160	67.0	34%	34%	0.0	0.0	ОК	
99	MAAN	-	16	16	6	3 63		111	56.1	32%	32%	0.0	0.0	ОК	
99	AZRAQ		25				50	25	18.0			0.0	0.0	ОК	
	SAFAWI	10	_				20	10	6.8		34%	0.0	0.0	ОК	
	RWESHID	10					20	10	4.8		24%	0.0	0.0	ОК	
99	RESHA	12.5	12.5				25	12.5	4.2	17%	17%	0.0	0.0	ОК	

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ntingency State A	Analysis
BSP Grouping	BSP (Substation)		No	. of 1	ſR's		Capacity	Nº I Gapacity	Peak Demar	nd 2018	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load transfer between BSFs
1	AQ A2	40	40	63	63		206	143	77.4	38%		0.0	25.0	OK	
1	AQ IND	80	80				160	80	35.2	22%	25%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80		286	206	51.3	18%		0.0	10.0	OK	
2	QUWEIRA	16	45				61	16	17.8	29%	30%	1.8	6.0	OK	
2	DESI	63	63				126	63	38.3	30%	30%	0.0	6.0	OK	
3	EL_HASA	25	25				50	25	28.7	57%		3.7	5.0	OK	
3	Tafila	80	80				160	80		0%	21%	0.0	24.0	OK	NEPCO Committed Project
3	RASHADIA	16	40	40			96	56	34.4	36%		0.0	5.0	OK	
4	KARAK	16	16	25			57	32	39.3	69%	41%	7.3	10.0	OK	
4	KARAK SOUTH	80	80				160	80	53.6	34%	4170	0.0	20.0	OK	
5	SUBEIHI	63	63	63			189	126	107.1	57%		0.0	6.0	OK	To Salt 15%(28.4MVA)
5	SWEIMEH	80	80	80			240	160	87.3	36%	48%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63			148	85	75.3	51%	4078	0.0	3.0	OK	
5	WAQAS	63	63	63	-		189	126	94.4	50%		0.0	3.0	OK	
4	QATRANA	10	10	16			36	20	11.4	32%	-	0.0	10.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	67.0	34%	34%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	56.1	32%	32%	0.0	0.0	OK	
99	AZRAQ	25	25				50	25	18.0	36%	36%	0.0	0.0	OK]
99	SAFAWI	10	10				20	10	6.8	34%	34%	0.0	0.0	OK]
99	RWESHID	10	10				20	10	4.8	24%	24%	0.0	0.0	OK]
99	RESHA	12.5	12.5				25	12.5	4.2	17%	17%	0.0	0.0	OK]
									Avera	ge	31%				

Table 14	BSP Analysis by the BSP	Grouping Method for EDCO in 2019

BSP	BSP						Installed	N-1 Capacity	Norma	al State Ana			Co	ontingency State A	nalysis
Brouping	(Substation)		No	of T	'R's		Capacity		Peak Deman	nd 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	AQ A2	40	40	63	63		206	143	81.5	40%		0.0	25.0	ОК	
1	AQ IND		80				160	80	37.1	23%	26%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80		286	206	54.1	19%		0.0	10.0	ОК	
2	QUWEIRA		45				61	16	18.7	31%	32%	2.7	6.0	ОК	
2	DESI	63	63				126	63	40.4	32%	5270	0.0	6.0	ОК	
3	EL_HASA	25	25				50	25	30.3	61%		5.3	5.0	No	
3	Tafila	80	80				160	80	0.0	0%	22%	0.0	24.0	ОК	
3	RASHADIA	16	40	40			96	56	36.2	38%		0.0	5.0	ОК	
4	KARAK	16	16	25			57	32	41.4	73%	43%	9.4	10.0	ОК	
4	KARAK SOUTH	80	80				160	80	56.5	35%	43%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63			189	126	112.8	60%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80			240	160	91.9	38%	50%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63			148	85	79.3	54%	50%	0.0	3.0	ОК	
5	WAQAS	63	63	63			189	126	99.4	53%		0.0	3.0	ОК	
4	QATRANA	10	10	16			36	20	12.0	33%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	70.6	35%	35%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	59.1	34%	34%	0.0	0.0	ОК	
99	AZRAQ	25	25				50	25	19.0	38%	38%	0.0	0.0	ОК	
99	SAFAWI	10	10				20	10	7.2	36%	36%	0.0	0.0	ОК	
99	RWESHID	10	10				20	10	5.0	25%	25%	0.0	0.0	ОК	
99	RESHA	12.5	12.5				25	12.5	4.4	18%	18%	0.0	0.0	ОК	
-									Avera	ae	33%				

							Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP Grouping	BSP (Substation)		No	. of	TR's		Capacity	Nº I Capacity	Peak Deman	id 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load fransier between Bors
1	AQ A2	40	40	63	3 63	5	206	143	81.5	40%		0.0	25.0	OK	
1	AQ IND	80	80				160	80	37.1	23%	26%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80) 80		286	206	54.1	19%		0.0	10.0	OK	
2	QUWEIRA	16	45				61	16	18.7	31%	32%	2.7	6.0	ОК	
2	DESI	63	63				126	63	40.4	32%	3276	0.0	6.0	OK	
3	EL_HASA	25	25				50	25	15.3	31%		0.0	5.0	OK	To Tafila 30%(15.0MVA)
3	Tafila	80	80				160	80	15.0	9%	22%	0.0	24.0	ОК	From El Hasa
3	RASHADIA	16	40	40)		96	56	36.2	38%		0.0	5.0	OK	
4	KARAK	16	16	25	5		57	32	41.4	73%	43%	9.4	10.0	OK	
4	KARAK SOUTH	80	80				160	80	56.5	35%	43%	0.0	20.0	OK	
5	SUBEIHI	63	63	63	3		189	126	112.8	60%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80)		240	160	91.9	38%	50%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	3		148	85	79.3	54%	50%	0.0	3.0	ОК	
5	WAQAS	63	63	63	3		189	126	99.4	53%		0.0	3.0	OK	
4	QATRANA	10	10	16	6		36	20	12.0	33%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40) 40	40	200	160	70.6	35%	35%	0.0	0.0	OK	
99	MAAN	16	16	16	6 63	63	174	111	59.1	34%	34%	0.0	0.0	OK	
99	AZRAQ	25	25				50	25	19.0	38%	38%	0.0	0.0	OK	
99	SAFAWI	10	10				20	10	7.2	36%	36%	0.0	0.0	OK	
99	RWESHID	10	10				20	10	5.0	25%	25%	0.0	0.0	OK	
99	RESHA	12.5	12.5				25	12.5	4.4	18%	18%	0.0	0.0	ОК	
									Avera	ge	33%				

Table 15	BSP Analysis by the BSP	Grouping Method for EDCO in 2020

BSP	BSP						Installed	N-1 Capacity	Norm	al State Ana	1.1		Co	ontingency State A	nalysis
Brouping	(Substation)		No	of T	'R's		Capacity		Peak Demar	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	AQ A2	40	40	63	63		206	143	85.9	42%		0.0	25.0	ОК	
1	AQ IND		80				160	80	39.0	24%	28%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80		286	206	57.0	20%		0.0	10.0	ОК	
2	QUWEIRA		45				61	16	19.7	32%	33%	3.7	6.0	ОК	
2	DESI	63	63				126	63	42.5	34%	55%	0.0	6.0	ОК	
3	EL_HASA	25	25				50	25	16.1	32%		0.0	5.0	ОК	
3	Tafila	80	80				160	80	15.8	10%	23%	0.0	24.0	ОК	
3	RASHADIA	16	40	40			96	56	38.1	40%		0.0	5.0	ОК	
4	KARAK	16	16	25			57	32	43.6	77%	46%	11.6	10.0	No	
4	KARAK SOUTH	80	80				160	80	59.5	37%	40%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63			189	126	118.8	63%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80			240	160	96.9	40%	53%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63			148	85	83.5	56%	53%	0.0	3.0	ОК	
5	WAQAS	63	63	63			189	126	104.8	55%		0.0	3.0	ОК	
4	QATRANA	10	10	16			36	20	12.6	35%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	74.4	37%	37%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	62.2	36%	36%	0.0	0.0	ОК	
99	AZRAQ	25	25				50	25	20.0	40%	40%	0.0	0.0	ОК	
99	SAFAWI	10	10				20	10	7.6	38%	38%	0.0	0.0	ОК	
99	RWESHID	10	10				20	10	5.3	27%	27%	0.0	0.0	ОК	
99	RESHA	12.5	12.5				25	12.5	4.7	19%	19%	0.0	0.0	ОК	
-									Avera	ae	34%				

							Installed	N-1 Capacity	Norma	al State Ana	% Operating rate (%) Necessary for N+1 Observation Possibility Transfer 42% 24% 0.0 1 24% 28% 0.0 1 20% 0.0 1 1 20% 0.0 1 1 32% 3.3% 0.0 1 32% 0.0 1 1 32% 0.0 1 1 10% 37% 0.0 1 40% 0.0 1 1 40% 0.0 1 1 56% 0.0 1 1 55% 0.0 1 1 55% 0.0 1 1 37% 37% 0.0 1 36% 36% 0.0 1 37% 37% 0.0 1 36% 36% 0.0 1 36% 38% 0.0 1	Co	ontingency State A	nalysis	
BSP Grouping	BSP (Substation)		No	. of 1	'R's		Capacity	Nº I Capacity	Peak Deman	id 2020			Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%			Transfer MVA	Check	Load mansfel between Bors
1	AQ A2	40	40	63	63		206	143	85.9	42%		0.0	25.0	OK	
1	AQ IND	80	80				160	80	39.0	24%	28%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80		286	206	57.0	20%		0.0	10.0	ОК	
2	QUWEIRA	16	45				61	16	19.7	32%	220/	3.7	6.0	ОК	
2	DESI	63	63				126	63	42.5	34%	33%	0.0	6.0	OK	
3	EL_HASA	25	25				50	25	16.1	32%		0.0	5.0	ОК	
3	Tafila	80	80				160	80	15.8	10%	37%	0.0	24.0	ОК	
3	RASHADIA	16	40	40			96	56	38.1	40%		0.0	5.0	OK	
4	KARAK	63	63	25	_		151	88	43.6	29%	220/	0.0	10.0	ОК	
4	KARAK SOUTH	80	80				160	80	59.5	37%	33%	0.0	20.0	OK	
5	SUBEIHI	63	63	63			189	126	118.8	63%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80			240	160	96.9	40%	53%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63			148	85	83.5	56%	5578	0.0	3.0	OK	
5	WAQAS	63	63	63			189	126	104.8	55%		0.0	3.0	OK	
4	QATRANA	10	10	16			36	20	12.6	35%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	74.4	37%	37%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	62.2	36%	36%	0.0	0.0	ОК	
99	AZRAQ	25	25				50	25	20.0	40%	40%	0.0	0.0	OK	
99	SAFAWI	10	10				20	10	7.6	38%	38%	0.0	0.0	ОК	
99	RWESHID	10	10				20	10	5.3	27%	27%	0.0	0.0	OK	
99	RESHA	12.5	12.5				25	12.5	4.7	19%	19%	0.0	0.0	ОК	
								-	Avera	ge	35%	1			

Table 16BSP Analysis by the BSP Grouping Method for EDCO in 2021

							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Grouping	BSP (Substation)		No	. of 1	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2021	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	90.5	44%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	41.1	26%	29%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	60.0	21%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	20.8	34%	35%	4.8	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	44.8	36%	35%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	16.9	34%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	16.6	10%	24%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	40.2	42%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	46.0	30%	050/	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	62.7	39%	35%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	125.2	66%		0.0	6.0	OK	
5	SWEIMEH	80	80	80	0	0	240	160	102.0	43%	56%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	88.0	59%	50%	3.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	110.4	58%		0.0	3.0	ОК	
4	QATRANA	10	10	16	0	0	36	20	13.3	37%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	78.4	39%	39%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	65.6	38%	38%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	21.1	42%	42%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.0	40%	40%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	5.6	28%	28%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.9	20%	20%	0.0	0.0	ОК	
									Avera	ae	35%				

ii) After countermeasures

BSP	BSP							Installed	N-1 Capacity	Norm	al State Ana			Co	ontingency State A	nalysis
Grouping	BSP (Substation)		No	. of T	'R's			Capacity	it i oupdoily	Peak Demar	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	, ,							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load manarer between bora
1	AQ A2	40	40	63	63	3 (0	206	143	90.5	44%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	C	160	80	41.1	26%	29%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80) (0	286	206	60.0	21%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	(0	61	16	20.8	34%	35%	4.8	6.0	ОК	
2	DESI	63	63	0	0	(0	126	63	44.8	36%	30%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	(0	50	25	16.9	34%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	0	160	80	16.6	10%	24%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	(D	96	56	40.2	42%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	(0	151	88	46.0	30%	35%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	(C	160	80	62.7	39%	35%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	(0	189	126	125.2	66%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	(D	240	160	102.0	43%	56%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	(D	148	85	88.0	59%	20%	3.0	3.0	ОК	
5	WAQAS	63	63	63	0	(C	189	126	110.4	58%		0.0	3.0	ОК	
4	QATRANA	10	10	16	0	(0	36	20	13.3	37%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	4	0	200	160	78.4	39%	39%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	6	i3	174	111	65.6	38%	38%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	(0	50	25	21.1	42%	42%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	(0	20	10	8.0	40%	40%	0.0	0.0	OK	
99	RWESHID	10	10	0	0	(0	20	10	5.6	28%	28%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	(D	25	12.5	4.9	20%	20%	0.0	0.0	ОК	
										Avera	ae	35%				

Table 17	BSP Analysis by the BSP (Grouping Method for EDCO in 2022

							Installed		Norm	al State An	alysis		Co	ntingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of 1	R's		Capacity	N-1 Capacity	Peak Demai	nd 2022	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	95.3	46%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	43.3	27%	31%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	63.2	22%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	21.9	36%	37%	5.9	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	47.2	37%	31%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	17.8	36%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	17.5	11%	25%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	42.3	44%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	48.4	32%	37%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	66.0	41%	31%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	131.9	70%		5.9	6.0	OK	
5	SWEIMEH	80	80	80	0	0	240	160	107.5	45%	59%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	92.7	63%	59%	7.7	3.0	No	
5	WAQAS	63	63	63	0	0	189	126	116.2	62%		0.0	3.0	ОК	
4	QATRANA	10	10	16	0	0	36	20	14.0	39%	-	0.0	10.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	82.6	41%	41%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	69.1	40%	40%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	22.2	44%	44%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.4	42%	42%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	5.9	30%	30%	0.0	0.0	OK	
99	RESHA	12.5	12.5	0	0	0	25	12.5	5.2	21%	21%	0.0	0.0	OK	
	•								Avera	ae	37%				

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP Grouping	BSP (Substation)		No.	of TF	's		Capacity	Nº1 Capacity	Peak Demar	nd 2022	Group	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
yy							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40 4	0	63	63	0	206	143	95.3	46%		0.0	25.0	OK	
1	AQ IND	80 8	0	0	0	0	160	80	43.3	27%	31%	0.0	15.0	OK	
1	AQTH & NEW	63 6	3	80	80	0	286	206	63.2	22%		0.0	10.0	OK	
2	QUWEIRA	16 4	5	0	0	0	61	16	21.9	36%	37%	5.9	6.0	OK	
2	DESI	63 6	3	0	0	0	126	63	47.2	37%	31 %	0.0	6.0	OK	
3	EL_HASA	25 2	5	0	0	0	50	25	17.8	36%		0.0	5.0	OK	
3	Tafila	80 8	0	0	0	0	160	80	17.5	11%	25%	0.0	24.0	OK	
3	RASHADIA	16 4	0	40	0	0	96	56	42.3	44%		0.0	5.0	OK	
4	KARAK	63 6	3	25	0	0	151	88	48.4	32%	37%	0.0	10.0	OK	
4	KARAK SOUTH	80 8	0	0	0	0	160	80	66.0	41%	51 /6	0.0	20.0	OK	
5	SUBEIHI	63 6	3	63	0	0	189	126	111.9	59%		0.0	6.0	OK	
5	SWEIMEH	80 8	0	80	0	0	240	160	107.5	45%		0.0	3.0	OK	
5	New BSP	63 6	3				126	63	50.0	40%	50%	0.0	9.5	OK	BSP study at Group 5
5	ISHTAFINA	40 4	5	63	0	0	148	85	72.7	49%		0.0	3.0	OK	
5	WAQAS	63 6	3	63	0	0	189	126	106.2	56%		0.0	3.0	ОК	
4	QATRANA	10 1	0	16	0	0	36	20	14.0	39%	-	0.0	10.0	OK	
99	GHORSAFI	40 4	_	40	40	40	200	160	82.6	41%	41%	0.0	0.0	OK	
99	MAAN	16 1	6	16	63	63	174	111	69.1	40%	40%	0.0	0.0	OK	
99	AZRAQ	25 2	5	0	0	0	50	25	22.2	44%	44%	0.0	0.0	ОК	
99	SAFAWI	10 1	0	0	0	0	20	10	8.4	42%	42%	0.0	0.0	OK	
99	RWESHID	10 1	0	0	0	0	20	10	5.9	30%	30%	0.0	0.0	OK	
99	RESHA	12.5 12	.5	0	0	0	25	12.5	5.2	21%	21%	0.0	0.0	OK	
						_			Avera	ge	36%				

Table 18	BSP Analysis by	the BSP Grouping Method for EDCO in 2023

Conting Continue No. of TR* CabRetly Peak Demond 2023 Continue Continue Peak Demond 2023 Continue Resultand Peak Demond 2023 Continue Peak Demond 2023 Peak Demond 2023 Continue Peak Demond 2023 Continteremation Peak Demond 2023		nalysis	ontingency State A	Co		lysis	al State Ana	Norma		Installed								
Image: Control Image: Contro Image: C			N-1 Observation	Possible Load			id 2023	Peak Deman	N-1 Capacity	Capacity		∛s	of TR	No. c	N		BSP (Substation)	BSP
1 AQ IND 80 80 0 0 160 80 44.66 29% 33% 0.0 15.0 OK 1 AQTH & NEW 63 63 80 0 286 206 66.6 23% 0.0 10.0 OK 2 QUWEIRA 16 45 0 0 0 61 16 23.1 38% 0.0 10.0 OK 2 QUWEIRA 16 45 0 0 0 61 16 23.1 38% 0.0 10.0 OK 3 Tafila 80 0 0 126 63 49.7 39% 7.1 6.0 No 3 Tafila 80 0 0 160 80 18.5 12% 27% 0.0 24.0 OK 3 Tafila 80 0 0 160 80 68.6 43% 27% 0.0 20.0 OK 4 KARAK 63 63 0 0 126 63	d Transfer between BSPs	Load Iran	Check	Transfer MVA			%	[MVA]	[MVA]	[MVA]							(oubstation)	Jouping
AQTH & NEW 63 63 80 90 2 260 66.6 23% 0 0.0 10.0 OK 2 QUWEIRA 16 45 0 0 0 61 16 23.1 38% 3% 7.1 6.0 No 2 DESI 63 63 0 0 126 63 49.7 39% 7.1 6.0 No 3 EL HASA 25 2 0 0 160 80 18.5 12% 7.0 0.0 0.0 0K 3 Tafila 80 0 0 0 96 56 44.6 46% 0.0 0.0 0.0K 4 KARAK 63 63 0 0 150 880 69.6 43% 70.0 0.00 0.0K 4 KARAK 63 63 0 0 160 111.2 47% 0.0 0.0 0.0K			ОК	25.0	0.0		49%	100.4	143	206	0	63	63	0	40	40	AQ A2	1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			ОК	15.0	0.0	33%	29%	45.6	80	160	0	0	0	0	80	80	AQ IND	1
2 DESI 63 64 0 0 126 63 449.7 39% 0.0 6.0 OK 3 EL,HASA 25 25 0 0 0 50 25 18.8 38% 0.0 0.0 0.0 50 25 18.8 38% 0.0 0.0 0.0 0.0 160 800 18.5 12% 0.0 0.0 24.0 OK 3 RASHADIA 16 40 0 0 96 56 44.6 46% 0.0 0.0 24.0 OK 4 KARAK 63 63 25 0 151 88 51.0 34% 0.0 10.0 OK 4 KARAK SOUTH 80 80 0 151 88 51.0 34% 0.0 0.0 CK 5 SUBEIHI 63 63 0 0 126 63 52.7 42% 0.0 0			OK	10.0	0.0		23%	66.6	206	286	0	80	80	3	63	63	AQTH & NEW	1
2 DESI 63 63 0 0 126 63 44.7 39% 0 0.0 6.0 OK 3 EL_HASA 25 25 0 0 0 50 25 18.8 38% 27% 0.0 5.0 OK 3 Tafila 80 80 0 0 1600 800 18.5 12% 0.00 5.0 OK 4 KARAK 63 63 25 0 0 1600 80 18.5 13% 27% 0.00 5.0 OK 4 KARAK 63 63 0 0 1600 80 34% 3% 0.0 10.0 OK 4 KARAK SOUTH 80 80 0 0 1489 126 117.9 62% 0.0 0.00 0.0 OK 5 SWEIMEH 80 8 0 0 126 63 52%			No	6.0	7.1	200/	38%	23.1	16	61	0	0	0	5	45	16	QUWEIRA	2
3 Tafila 80 80 0 0 160 80 18.5 12% 27% 0.0 24.0 OK 3 RASHADIA 16 40 40 0 9 56 44.6 46% 0.0 5.0 OK 4 KARAK 63 63 25 0 0 151 88 51.0 34%			ОК	6.0	0.0	39%	39%	49.7	63	126	0	0	0	3	63	63	DESI	2
3 RASHADIA 16 40 0 0 96 56 44.6 46% 0.0 5.0 0.0 5.0 0.0 4 KARAK 63 63 25 0 0 151 88 51.0 34% 3% 0.0 10.0 0.0 4 KARAK SOUTH 80 80 0 0 160 80 63.6 43% 0.0 10.0 0.0 0.0 5 SUBEIHI 63 63 0 0 189 126 117.9 62% 0.0 0.0 0.0 0.0 0.0 0.0 5 SWEIMEH 80 80 0 0 240 160 113.2 47% 0.0 0.0 0.0 0.0 0.0 5 SWEIMEH 80 63 63 0 0 126 63 52.7 42% 0.0 0.0 0.0 0.0 5 MAQAS 63 63 63 0 1189 126 111.9 59% 0.0 0.0			OK	5.0	0.0		38%	18.8	25	50	0	0	0	5	25	25	EL_HASA	3
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			OK	24.0	0.0	27%	12%	18.5	80	160	0	0	0	0	80	80	Tafila	3
4 KARAK SOUTH 80 80 0 0 160 80 69.6 43% 39% 0.0 20.0 OK 5 SUBEIHI 63 63 63 0 0 189 126 117.9 62% 0.0 0.0 0.0 OK 5 SWEIMEH 80 80 0 0 240 160 113.2 47% 0.0 0.0 0.0 OK 5 New BSP 63 63 0 0 126 63 52.7 42% 0.0 0.0 0.5 OK 5 New BSP 63 63 0 0 148 85 76.5 52% 0.0 0.0 0.0 OK 5 WAQAS 63 63 0 0 148 85 76.5 52% 0.0 0.0 0.0 OK 4 QATRANA 10 10 16 200 160 87.0 43% 0.0 0.0 OK 99 MAAN 16 16			ОК	5.0	0.0		46%	44.6	56	96	0	0	40	0	40	16	RASHADIA	3
4 KARAK SOUTH 80 80 80 60 60.6 43% 0.0 20.0 0K 5 SUBEIHI 63 63 0 0 189 126 117.9 62% 0.0 20.0 0K 5 SUBEIHI 63 63 0 0 189 126 117.9 62% 0.0 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 1240 1100 113.2 47% 0.0 0.0 0.0 0K 5 INM BSP 63 63 0 0 1240 1100 113.2 47% 0.0 0.0 0.0 0K 5 ISHTAFINA 40 45 63 0 148 855 76.5 52% 0.0 0.0 0.0 0K 5 IMAAS 63 63 63 0 0 366 20 14.7 41% 0.0 0.0 0K 4 AATRAN 10 10 0 3			OK	10.0	0.0	200/	34%	51.0	88	151	0	0	25	3	63	63	KARAK	4
SWEIMEH 80 80 80 80 80 90 240 160 113.2 47% 5 New BSP 63 63 0 0 126 63 52.7 42% 5 ISHTAFINA 40 45 63 0 148 85 76.5 52% 0.0 3.0 OK 5 WAQAS 63 63 0 0 148 85 76.5 52% 0.0 3.0 OK 4 QATRANA 10 10 16 0 3.66 2.0 14.7 41% - 0.0 3.0 OK 99 GHORSAFI 40 40 40 200 160 87.0 43% 0.0 0.0 OK 99 MAN 16 16 63 174 111 72.8 42% 42% 0.0 0.0 OK 99 AZRAQ 25 5 0 0 </td <td></td> <td></td> <td>ОК</td> <td>20.0</td> <td>0.0</td> <td>39%</td> <td>43%</td> <td>69.6</td> <td>80</td> <td>160</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>80</td> <td>80</td> <td>KARAK SOUTH</td> <td>4</td>			ОК	20.0	0.0	39%	43%	69.6	80	160	0	0	0	0	80	80	KARAK SOUTH	4
New BSP 63 64 0 0 126 63 527 42% 5 ISHTAFINA 40 45 63 0 0 148 85 76.5 52% 0.0 0.0 0.0 0.0 5 WAQAS 63 63 63 0 0 189 126 111.9 59% 0.0 3.0 0K 4 QATRANA 10 10 16 0 3.66 2.00 14.7 41% - 0.0 10.0 0K 99 GHORSAFI 40 40 40 200 160 87.0 43% 43% 0.0 0.0 0.0K 99 MAAN 16 16 63 63 174 111 72.8 42% 0.0 0.0 0.K 99 AZRAQ 25 25 0 0 255 23.4 47% 47% 0.0 0.00 0K <			OK	6.0	0.0		62%	117.9	126	189	0	0	63	3 (63	63	SUBEIHI	5
5 ISHTAFINA 40 45 63 0 0 148 85 76.5 52% 0.0 3.0 OK 5 WAQAS 63 63 63 63 63 0 0 189 126 111.9 59% 0.0 3.0 OK 4 QATRANA 10 10 16 0 3.6 2.0 14.7 41% - 0.0 3.0 OK 99 GHORSAFI 40 40 40 2.00 160 87.0 43% 43% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 72.8 42% 0.0 0.0 OK 99 AZRAQ 25 25 0 550 255 23.4 47% 47% 0.0 0.0 OK 99 SAFAWI 10 0 0 2.0 100 8.9 44% 4.			OK	3.0	0.0		47%	113.2	160	240	0	0	80	0	80	80	SWEIMEH	5
5 WAQAS 63 64 6			ОК	9.5	0.0	53%	42%	52.7	63	126	0	0	0	3	63	63	New BSP	5
4 QATRANA 10 10 16 0 36 20 14.7 41% - 0.0 10.0 OK 99 GHORSAFI 40 40 40 200 160 87.0 43% 43% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 72.8 42% 42% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 500 25 23.4 47% 47% 0.0 0.0 OK 99 SAFAWI 10 0 0 200 100 8.9 44% 44% 0.0 0.0 OK 99 RWESHID 10 0 0 200 100 6.2 31% 31% 0.0 0.0 OK			ОК	3.0	0.0		52%	76.5	85	148	0	0	63	5 (45	40	ISHTAFINA	5
99 GHORSAFI 40 40 40 200 160 87.0 43% 43% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 72.8 42% 42% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 500 25 23.4 47% 47% 0.0 0.0 OK 99 SAFAWI 10 10 0 20 10 8.9 44% 44% 0.0 0.0 OK 99 RWESHID 10 0 0 20 10 6.2 31% 31% 0.0 0.0 OK			ОК	3.0	0.0		59%	111.9	126	189	0	0	63	3 (63	63	WAQAS	5
99 MAAN 16 16 16 63 63 174 111 72.8 42% 42% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 50 25 23.4 47% 47% 0.0 0.0 OK 99 SAFAWI 10 10 0 20 10 8.9 44% 44% 0.0 0.0 OK 99 RWESHID 10 10 0 20 10 6.2 31% 31% 0.0 0.0 OK			ОК	10.0	0.0	-	41%	14.7	20	36	0	0	16	0	10	10	QATRANA	4
99 AZRAQ 25 25 0 0 0 50 25 23.4 47% 47% 0.0 0.0 OK 99 SAFAWI 10 10 0 0 20 10 8.9 44% 44% 0.0 0.0 OK 99 RWESHID 10 10 0 20 10 6.2 31% 31% 0.0 0.0 OK			OK	0.0	0.0	43%	43%	87.0	160	200	40	40	40	0	40	40	GHORSAFI	99
99 SAFAWI 10 10 0 0 20 10 8.9 44% 44% 0.0 0.0 OK 99 RWESHID 10 10 0 0 20 10 6.2 31% 31% 0.0 0.0 OK			OK	0.0	0.0	42%	42%	72.8	111	174	63	63	16	6	16	16	MAAN	99
99 RWESHID 10 10 0 0 0 20 10 6.2 31% 31% 0.0 0.0 OK			OK	0.0	0.0	47%	47%	23.4	25	50	0	0	0	5	25	25	AZRAQ	99
			OK	0.0	0.0	44%	44%	8.9	10	20	0	0	0	0	10	10	SAFAWI	99
			OK	0.0	0.0	31%	31%	6.2	10	20	0	0	0	0	10	10	RWESHID	99
99 RESHA 125 12.5 0 0 0 25 12.5 5.5 22% 22% 0.0 0.0 OK			OK	0.0	0.0	22%	22%	5.5	12.5	25	0	0	0	5	12.5	12.5	RESHA	99

ii)	Aftor	counte	rmaac	IIROC

								Installed	N-1 Capacity	Norma	I State Ana	alysis		Co	ontingency State A	Inalysis	
BSP Grouping	BSP (Substation)		No	. of T	'R's			Capacity	Net Capacity	Peak Deman	d 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs	
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Ebau manarer between bors	
1	AQ A2	40	40	63	63	0		206	143	100.4	49%		0.0	25.0	OK		
1	AQ IND	80	80	0	0	0		160	80	45.6	29%	33%	0.0	15.0	ОК		
1	AQTH & NEW	63	63	80	80	0		286	206	66.6	23%		0.0	10.0	OK		
2	QUWEIRA	16	45	0	0	0		61	16	13.9	23%	39%	0.0	6.0	ОК	To Desi 15%(9.2MVA)	
2	DESI	63	63	0	0	0		126	63	58.8	47%	39%	0.0	6.0	OK	From Quweira	
3	EL_HASA	25	25	0	0	0		50	25	18.8	38%		0.0	5.0	ОК		
3	Tafila	80	80	0	0	0		160	80	18.5	12%	27%	0.0	24.0	OK		
3	RASHADIA	16	40	40	0	0		96	56	44.6	46%		0.0	5.0	OK		
4	KARAK	63	63	25	0	0		151	88	51.0	34%	39%	0.0	10.0	OK		
4	KARAK SOUTH	80	80	0	0	0		160	80	69.6	43%	3378	0.0	20.0	OK		
5	SUBEIHI	63	63	63	0	0		189	126	117.9	62%		0.0	6.0	ОК		
5	SWEIMEH	1	80	80	0	0		240	160	113.2	47%		0.0	3.0	ОК		
5	New BSP	63	63	0	0	0		126	63	52.7	42%	53%	0.0	9.5	ОК		
5	ISHTAFINA	40		63	0	0		148	85	76.5	52%		0.0	3.0	ОК		
5	WAQAS	63	63	63	0	0		189	126	111.9	59%		0.0	3.0	OK		
4	QATRANA	10	10	16	0	0		36	20	14.7	41%	-	0.0	10.0	ОК		
99	GHORSAFI	40	40	40	40	40)	200	160	87.0	43%	43%	0.0	0.0	ОК		
99	MAAN		16	16	63	63	3	174	111	72.8	42%	42%	0.0	0.0	OK		
99	AZRAQ	25	25	0	0	0		50	25	23.4	47%	47%	0.0	0.0	OK		
99	SAFAWI	10	10	0	0	0		20	10	8.9	44%	44%	0.0	0.0	OK		
99	RWESHID	10	10	0	0	0		20	10	6.2	31%	31%	0.0	0.0	OK		
99	RESHA	12.5	12.5	0	0	0		25	12.5	5.5	22%	22%	0.0	0.0	OK		
	-									Avera	je	38%					

Table 19	BSP Analysis by the BSP Grouping Meth	nod for EDCO in 2024

							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Grouping	BSP (Substation)		No	. of T	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2023	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(Substation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	100.4	49%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	45.6	29%	33%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	66.6	23%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	23.1	38%	39%	7.1	6.0	No	
2	DESI	63	63	0	0	0	126	63	49.7	39%	39%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	18.8	38%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	18.5	12%	27%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	44.6	46%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	51.0	34%	39%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	69.6	43%	39%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	117.9	62%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	113.2	47%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	0	126	63	52.7	42%	53%	0.0	9.5	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	76.5	52%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	111.9	59%		0.0	3.0	OK	
4	QATRANA	10	10	16	0	0	36	20	14.7	41%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	87.0	43%	43%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	3 174	111	72.8	42%	42%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	23.4	47%	47%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	44%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	6.2	31%	31%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	5.5	22%	22%	0.0	0.0	ОК	
						_			Avera	ge	38%				

	Aftor	countermeasures
- HU	Aller	countermeasures

								Installed	N-1 Capacity	Norma	I State Ana	llysis		Co	ntingency State A	nalysis	
BSP Grouping	BSP (Substation)		No	o. of T	ſR's			Capacity	N=1 Capacity	Peak Deman	d 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs	
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Ebau fransfel between bors	
1	AQ A2	40	40	63	63	0		206	143	100.4	49%		0.0	25.0	OK		
1	AQ IND	80	80	0	0	0		160	80	45.6	29%	33%	0.0	15.0	OK		
1	AQTH & NEW	63	63	80	80	0		286	206	66.6	23%		0.0	10.0	OK		
2	QUWEIRA	16	45	0	0	0		61	16	13.9	23%	39%	0.0	6.0	ОК	To Desi 15%(9.2MVA)	
2	DESI	63	63	0	0	0		126	63	58.8	47%	3378	0.0	6.0	OK	From Quweira	
3	EL_HASA	25	25	0	0	0		50	25	18.8	38%		0.0	5.0	OK		
3	Tafila	80	80	0	0	0		160	80	18.5	12%	27%	0.0	24.0	OK		
3	RASHADIA	16	40	40	0	0		96	56	44.6	46%		0.0	5.0	OK		
4	KARAK	63	63	25	0	0		151	88	51.0	34%	39%	0.0	10.0	ОК		
4	KARAK SOUTH	80	80	0	0	0		160	80	69.6	43%	3378	0.0	20.0	OK		
5	SUBEIHI	63	63	63	0	0		189	126	117.9	62%		0.0	6.0	OK		
5	SWEIMEH	80			0	0		240	160	113.2	47%		0.0	3.0	ОК		
5	New BSP	63	63	0	0	0		126	63	52.7	42%	53%	0.0	9.5	OK		
5	ISHTAFINA		45		0	0		148	85	76.5	52%		0.0	3.0	OK		
5	WAQAS	63		_	0	0		189	126	111.9	59%		0.0	3.0	OK		
4	QATRANA	10	10	16	0	0		36	20	14.7	41%	-	0.0	10.0	ОК		
99	GHORSAFI	40	40	40	40	-	_	200	160	87.0	43%	43%	0.0	0.0	ОК		
99	MAAN	3	16	16	63	63	3	174	111	72.8	42%	42%	0.0	0.0	OK		
99	AZRAQ		25	0	0	0		50	25	23.4	47%	47%	0.0	0.0	ОК		
99	SAFAWI	10	10	0	0	0		20	10	8.9	44%	44%	0.0	0.0	ОК		
99	RWESHID	10	10	0	0	0		20	10	6.2	31%	31%	0.0	0.0	ОК		
99	RESHA	12.5	12.5	0	0	0		25	12.5	5.5	22%	22%	0.0	0.0	OK		
							_			Avera	je	38%					

Table 20BSP Analysis by the BSP Grouping Method for EDCO in 2025

							Installed		Norm	al State Ana	alysis		Co	ntingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of 1	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2025	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	111.4	54%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	50.6	32%	36%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	73.9	26%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	15.4	25%	43%	0.0	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	65.3	52%	43%	2.3	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	20.9	42%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	20.5	13%	30%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	49.5	52%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	56.6	37%	43%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	77.2	48%	43%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	130.8	69%		4.8	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	125.6	52%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	0	126	63	58.4	46%	59%	0.0	9.5	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	84.9	57%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	124.2	66%		0.0	3.0	ОК	
4	QATRANA	10	10	16	0	0	36	20	16.3	45%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	96.5	48%	48%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	80.7	46%	46%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	25.9	52%	52%	0.9	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	9.8	49%	49%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	6.9	34%	34%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	6.1	24%	24%	0.0	0.0	ОК	
									Avera	ge	42%				

ii) After countermeasu

	505						Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP Grouping	BSP (Substation)		No.	of T	R's		Capacity	- Net Gapacity	Peak Deman	id 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Edad manarer between bor a
1	AQ A2	40	40	63	63	0	206	143	111.4	54%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	50.6	32%	36%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80	0	286	206	73.9	26%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	61	16	15.4	25%	43%	0.0	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	65.3	52%	43 %	2.3	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	20.9	42%		0.0	5.0	OK	
3	Tafila	80	80	0	0	0	160	80	20.5	13%	30%	0.0	24.0	OK	
3	RASHADIA	16	40	40	0	0	96	56	49.5	52%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	56.6	37%	43%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	77.2	48%	43%	0.0	20.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	130.8	69%		4.8	6.0	OK	
5	SWEIMEH	80	80	80	0	0	240	160	125.6	52%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	0	126	63	58.4	46%	59%	0.0	9.5	OK	
5	ISHTAFINA	40	45	63	0	0	148	85	84.9	57%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	124.2	66%		0.0	3.0	ОК	
4	QATRANA	10	10	16	0	0	36	20	16.3	45%	-	0.0	10.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	96.5	48%	48%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	80.7	46%	46%	0.0	0.0	OK	
99	AZRAQ	25	25	63	0	0	113	50	25.9	23%	23%	0.0	0.0	OK	Addition of 63MVA transformer
99	SAFAWI	10	10	0	0	0	20	10	9.8	49%	49%	0.0	0.0	OK	
99	RWESHID	10	10	0	0	0	20	10	6.9	34%	34%	0.0	0.0	OK	
99	RESHA	12.5	12.5	0	0	0	25	12.5	6.1	24%	24%	0.0	0.0	OK	
									Avera	ge	40%		-		

Table 21BSP Analysis by the BSP Grouping Method for IDECO in 2016

(1) Year 2016 i) No countermeasure

,			Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP	BSP (Substation)	No. of TR's	Capacity	Nº I Capacity	Peak Deman	d 2016		Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)		[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80 60 63	203	123	161.5	80%		38.5	57.6	ОК	
1	IRBID EAST	80 80	160	80	70.3	44%	56%	0.0	22.3	ОК	
1	HASAN IND	80 80	160	80	59.2	37%		0.0	24.6	ОК	
2	REHAB	40 40	80	40	72.7	91%		32.7	34.3	ок	
2	MAFRAQ	80 80 80	240	160	57.9	24%	39%	0.0	48.2	ок	
2	SABHA	40 40	80	40	29.6	37%		0.0	25.9	ок	
2	DHULEIL	80 80	160	80	56.7	35%		0.0	15.5	ОК	
99	WAQAS	63 63	126	63	85.1	68%	-	22.1	25.1	ОК	
99	ISHTAFINA	40 45	85	40	67.8	80%	-	27.8	14.0	No	
99	SAFAWI	10	10	0	6.2	62%	I	6.2	2.6	No	
					Avera	ge	47%				

,		
) After	countermeasures

						Installed	N-1 Capacity	Norma	al State Ana	llysis			Contingency	State Analysis
BSP	BSP (Substation)		No	. of T	R's	Capacity	Nº I Capacity	Peak Demand 2016			Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)					[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63		203	123	161.5	80%		38.5	57.6	ОК	
1	IRBID EAST	80	80			160	80	70.3	44%	56%	0.0	22.3	ОК	
1	HASAN IND	80	80			160	80	59.2	37%		0.0	24.6	ОК	
2	REHAB	40	40			80	40	44.7	56%		4.7	34.3	ОК	To Mafraq 35%(28MVA)
2	MAFRAQ	80	80	80		240	160	85.9	36%	39%	0.0	48.2	ок	From Rehab
2	SABHA	40	40			80	40	29.6	37%	3378	0.0	25.9	ок	
2	DHULEIL	80	80			160	80	56.7	35%		0.0	15.5	ОК	
99	WAQAS	63	63			126	63	85.1	68%	-	22.1	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	67.8	46%	-	0.0	14.0	ОК	NEPCO committed project
99	SAFAWI	10				10	0	6.2	62%	-	6.2	2.6	No	NEPCO Committed Project in 2017
								Avera	ge	47%				

Table 22	BSP Analysis by the BSP Grouping Method for IDECO in 2017
Table 22	BSP Analysis by the BSP Grouping Method for IDECO in 2017
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						Installed	N-1 Capacity		al State Ana	alysis			Contingency S	State Analysis
BSP	BSP					Capacity		Peak Demar	nd 2017	Group	Load Transfer MVA			
Grouping	(Substation)		No.	of Th	₹'s	[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	IRBID	80	60	63		203	123	170.1	84%		47.1	57.6	ОК	
1	IRBID EAST	80	80			160	80	74.0	46%	59%	0.0	22.3	ОК	
1	HASAN IND	80	80			160	80	62.3	39%		0.0	24.6	ОК	
2	REHAB	40	40			80	40	47.1	59%		7.1	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	90.5	38%	41%	0.0	48.2	ОК	
2	SABHA	40	40			80	40	31.2	39%		0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	59.7	37%		0.0	15.5	ОК	
99	WAQAS	63	63			126	63	89.6	71%	-	26.6	25.1	No	
99	ISHTAFINA	40	45	63		148	85	71.4	48%	-	0.0	14.0	ОК	
99	SAFAWI	10				10	0	6.5	65%	-	6.5	2.6	No	
								Avera	ae	50%				

						Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of 1	'R's	Capacity	N=1 Capacity	Peak Demar	nd 2017	Group Operating rate	Load Transfer MVA Necessarv for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	60	63		203	123	170.1	84%		47.1	57.6	ОК	
1	IRBID EAST	80	80			160	80	74.0	46%	59%	0.0	22.3	ОК	
1	HASAN IND	80	80			160	80	62.3	39%		0.0	24.6	ОК	
2	REHAB	40	40			80	40	47.1	59%		7.1	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	90.5	38%		0.0	48.2	ОК	
2	SABHA	40	40			80	40	31.2	39%	41%	0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	59.7	37%		0.0	15.5	ОК	
99	WAQAS	63	63	63		189	126	89.6	47%	-	0.0	25.1	ОК	NEPCO Committed Project
99	ISHTAFINA	40	45	63		148	85	71.4	48%	-	0.0	14.0	ОК	
99	SAFAWI	10	10			20	10	6.5	32%	-	0.0	2.6	ОК	NEPCO Committed Project
								Avera	ge	50%				

						Installed	N-1 Capacity		al State Ana	alysis			Contingency	State Analysis
BSP	BSP		No	. of TR	'o	Capacity		Peak Demar	nd 2018	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)		NO	. 01 1K	5	[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63		203	123	179.2	88%		56.2	57.6	ОК	
1	IRBID EAST	80	80			160	80	78.0	49%	62%	0.0	22.3	ОК	
1	HASAN IND	80	80			160	80	65.7	41%		0.0	24.6	ок	
2	REHAB	40	40			80	40	49.7	62%		9.7	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	95.4	40%	43%	0.0	48.2	ОК	
2	SABHA	40	40			80	40	32.8	41%		0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	62.9	39%		0.0	15.5	ок	
99	WAQAS	63	63	63		189	126	94.4	50%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	75.3	51%	-	0.0	14.0	ОК	
99	SAFAWI	10	10			20	10	6.8	34%	-	0.0	2.6	ОК	
								Avera	qe	52%				

Table 23	BSP Analysis by the BSP	Grouping Method for IDECO in 2018

ii) After countermeasures Contingency State Analysis Nor al State Ar Installed Capacity lysi N-1 Capacity BSP Groupin BSP (Substation Group Operating rate Load Transfer MVA Necessary for N-1 d 2018 Peak De Possible Load Transfer MVA N-1 Observa Check Load Transfer between BSPs [MVA] [MVA] [MVA] % (%) Obse ation 80 60 63 IRBID 203 123 88% 56.2 57.6 ОК 1 179.2 IRBID EAST 80 80 62% 1 160 80 78.0 49% 0.0 22.3 ок 80 80 1 HASAN IND 160 80 65.7 41% 0.0 24.6 ок 40 40 2 REHAB 80 40 49.7 62% 9.7 34.3 ок 80 80 80 2 MAFRAQ 240 160 95.4 40% 0.0 48.2 ок 43% 40 40 2 SABHA 80 40 32.8 41% 0.0 25.9 ок 2 DHULEIL 80 80 160 80 62.9 39% 0.0 15.5 ок 99 WAQAS 63 63 63 189 126 94.4 50% 0.0 25.1 ок 99 ISHTAFINA 40 45 63 148 85 75.3 51% 0.0 14.0 ОК -99 SAFAWI 10 10 20 10 6.8 34% 0.0 2.6 ОК Average 52%

						Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP Frouping	BSP (Substation)		No	. of Ti	ל's	Capacity	N=1 Gapacity	Peak Demar	nd 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	(,					[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	60	63		203	123	188.8	93%		65.8	57.6	No	
1	IRBID EAST	80	80			160	80	82.2	51%	65%	2.2	22.3	ОК	
1	HASAN IND	80	80			160	80	69.2	43%		0.0	24.6	ОК	
2	REHAB	40	40			80	40	52.3	65%		12.3	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	100.5	42%		0.0	48.2	ОК	
2	SABHA	40	40			80	40	34.6	43%	45%	0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	66.3	41%		0.0	15.5	ОК	
99	WAQAS	63	63	63		189	126	99.4	53%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	79.3	54%	-	0.0	14.0	ОК	
99	SAFAWI	10	10			20	10	7.2	36%	-	0.0	2.6	ОК	
								Avera	ae	55%				

Table 24BSP Analysis by the BSP Grouping Method for IDECO in 2019

						Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of Ti	₹'s	Capacity	N=1 Capacity	Peak Demar	nd 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63		203	123	158.4	78%		35.4	57.6	ОК	To Hassan 12%(24.4MVA), Irbid E 3%(6.1MVA)
1	IRBID EAST	80	80			160	80	88.2	55%	65%	8.2	22.3	ОК	From Irbid
1	HASAN IND	80	80			160	80	93.5	58%		13.5	24.6	ОК	From Irbid
2	REHAB	40	40			80	40	52.3	65%		12.3	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	100.5	42%	45%	0.0	48.2	ОК	
2	SABHA	40	40			80	40	34.6	43%		0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	66.3	41%		0.0	15.5	ОК	
99	WAQAS	63	63	63		189	126	99.4	53%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	79.3	54%	-	0.0	14.0	ОК	
99	SAFAWI	10	10			20	10	7.2	36%	-	0.0	2.6	ОК	
								Avera	ge	55%				

						Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP rouping	BSP (Substation)		No	. of Ti	ל's	Capacity	Nº I Capacity	Peak Demar	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	60	63		203	123	166.8	82%		43.8	57.6	ОК	
1	IRBID EAST	80	80			160	80	93.0	58%	69%	13.0	22.3	ОК	
1	HASAN IND	80	80			160	80	98.5	62%		18.5	24.6	ОК	
2	REHAB	40	40			80	40	55.1	69%		15.1	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	105.8	44%	48%	0.0	48.2	ОК	
3	SABHA	40	40			80	40	36.4	46%		0.0	25.9	ОК	
3	DHULEIL	80	80			160	80	69.8	44%		0.0	15.5	ОК	
99	WAQAS	63	63	63		189	126	104.8	55%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	83.5	56%	-	0.0	14.0	ОК	
99	SAFAWI	10	10			20	10	7.6	38%	-	0.0	2.6	ОК	
								Avera	ae	58%				

Table 25BSP Analysis by the BSP Grouping Method for IDECO in 2020

ii) After	countermea	asu	res						Norm	al State Ana	alueie			Contingency	State Analysis
BSP	BSP		No	o. of	TR's		Installed Capacity	N-1 Capacity	Peak Demar		Group	Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	6	3		203	123	166.8	82%		43.8	57.6	ОК	
1	IRBID EAST	80	80				160	80	93.0	58%	69%	13.0	22.3	ОК	
1	HASAN IND	80	80	ĺ			160	80	98.5	62%		18.5	24.6	ОК	
2	REHAB	40	40	ĺ			80	40	55.1	69%		15.1	34.3	ОК	
2	MAFRAQ	80	80	8	D		240	160	105.8	44%		0.0	48.2	ОК	
3	SABHA	40	40	ĺ			80	40	36.4	46%	48%	0.0	25.9	ОК	
3	DHULEIL	80	80	ĺ			160	80	69.8	44%		0.0	15.5	ОК	
99	WAQAS	63	63	6	3		189	126	104.8	55%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	6	3		148	85	83.5	56%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	ĺ			20	10	7.6	38%	-	0.0	2.6	ОК	
								Avera	ge	58%					

Table 26	BSP Analysis by the BSI	P Grouping Method for IDECO in 2021

						Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP Frouping	BSP (Substation)		No	. of T	'R's	Capacity	Nº I Capacity	Peak Demar	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	IRBID	80	60	63		203	123	175.7	87%		52.7	57.6	ОК	
1	IRBID EAST	80	80			160	80	97.9	61%	72%	17.9	22.3	ОК	
1	HASAN IND	80	80			160	80	103.8	65%		23.8	24.6	ОК	
2	REHAB	40	40			80	40	58.0	73%		18.0	34.3	ОК	
2	MAFRAQ	80	80	80		240	160	111.5	46%	50%	0.0	48.2	ОК	
3	SABHA	40	40			80	40	38.4	48%		0.0	25.9	ОК	
3	DHULEIL	80	80			160	80	73.6	46%		0.0	15.5	ОК	
99	WAQAS	63	63	63		189	126	110.4	58%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	88.0	59%	-	3.0	14.0	ОК	
99	SAFAWI	10	10			20	10	8.0	40%	-	0.0	2.6	ОК	
								Avera	ae	61%				

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP Grouping	BSP (Substation)		No.	of Ti	₹'s		Capacity	N-1 Capacity	Peak Demar	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63			203	123	175.7	87%		52.7	57.6	ОК	
1	IRBID EAST	80	80				160	80	97.9	61%	72%	17.9	22.3	ОК	
1	HASAN IND	80	80				160	80	103.8	65%		23.8	24.6	ОК	
2	REHAB	40	40				80	40	58.0	73%		18.0	34.3	ОК	
2	MAFRAQ	80	80	80			240	160	111.5	46%	500/	0.0	48.2	ОК	
3	SABHA	40	40				80	40	38.4	48%	50%	0.0	25.9	ОК	
3	DHULEIL	80	80				160	80	73.6	46%		0.0	15.5	ОК	
99	WAQAS	63	63	63			189	126	110.4	58%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63			148	85	88.0	59%	-	3.0	14.0	ОК	
99	SAFAWI	10	10				20	10	8.0	40%	-	0.0	2.6	ОК	
									Avera	ae	61%				

BSP Grouping						Installed	N-1 Capacity	Norm	al State Ana	alysis	Contingency State Analysis				
	BSP (Substation)		No	. of Ti	₹'s	Capacity	Nº I Capacity	Peak Demand 2022			Load Transfer MVA	Possible Load	N-1 Observation		
	()					[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs	
1	IRBID	80	60	63		203	123 185.	185.1	91%		62.1	57.6	No		
1	IRBID EAST	80	80			160	80	103.1	64%	76%	23.1	22.3	No		
1	HASAN IND	80	80			160	80	109.3	68%		29.3	24.6	No		
2	REHAB	40	40			80	40	61.1	76%		21.1	34.3	ОК		
2	MAFRAQ	80	80	80		240	160	117.4	49%	53%	0.0	48.2	ОК		
3	SABHA	40	40			80	40	40.4	51%		0.4	25.9	ОК		
3	DHULEIL	80	80			160	80	77.5	48%		0.0	15.5	ОК		
99	WAQAS	63	63	63		189	126	116.2	62%	-	0.0	25.1	ОК		
99	ISHTAFINA	40	45	63		148	85	92.7	63%	-	7.7	14.0	ОК		
99	SAFAWI	10	10			20	10	8.4	42%	-	0.0	2.6	ОК		
								Avera	ae	64%					

Table 27BSP Analysis by the BSP Grouping Method for IDECO in 2022

	countermea						Installed	N-1 Capacity	Norm	al State Ana	alysis	Contingency State Analysis			
BSP Grouping	BSP (Substation)		No.	. of Ti	R's		Capacity		Peak Demand 2022			Load Transfer MVA	Possible Load	N-1 Observation	Land Transfer balance DOD-
pg							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63			203	123	154.7	76%		31.7	57.6	ОК	
1	IRBID EAST	80	80	80			240	160	149.6	62%	66%	0.0	22.3	ОК	Addition of 80MVA Transformer
1	HASAN IND	80	80				160	80	93.3	58%		13.3	24.6	ОК	
2	REHAB	40	40				80	40	61.1	76%		21.1	34.3	ОК	
2	MAFRAQ	80	80	80			240	160	117.4	49%	500/	0.0	48.2	ОК	
2	SABHA	40	40				80	40	40.4	51%	53%	0.4	25.9	ОК	
2	DHULEIL	80	80				160	80	77.5	48%		0.0	15.5	ОК	
99	WAQAS	63	63	63			189	126	116.2	62%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63			148	85	92.7	63%	-	7.7	14.0	ОК	
99	SAFAWI	10	10				20	10	8.4	42%	-	0.0	2.6	ОК	
									Avera	ge	59%				

Table 28	BSP Analysis by	the BSP Grouping Method for IDECO in 2023

BSP Grouping	505						Installed	N-1 Capacity	Norm	al State Ana	alysis	Contingency State Analysis			
	BSP (Substation)		No. of TR's		Capacity	N-1 Capacity	Peak Demand 2023			Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs		
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80 60 63 0 0				0	203	123	162.9 80	80%	%	39.9	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	157.6	66%	69%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	98.3	61%		18.3	24.6	ОК	
2	REHAB	40	40	0	0	0	80	40	64.4	81%		24.4	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	123.7	52%	56%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	42.6	53%		2.6	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	81.6	51%		1.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	122.5	65%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	97.6	66%	-	12.6	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	-	0.0	2.6	ОК	
									Avera	ae	63%				

BSP Grouping							Installed	N-1 Capacity	Norm	al State Ana	alysis	Contingency State Analysis				
	BSP (Substation)		No.	of TI	R's		Capacity		Peak Demand 2023			Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Las d Transford Laboration DODs	
							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPs	
1	IRBID	80	80 60 63 0 0				203	123	162.9	80%		39.9	57.6	ОК		
1	IRBID EAST	80	80	80	0	0	240	160	157.6	66%	69%	0.0	22.3	ОК		
1	HASAN IND	80	80	0	0	0	160	80	98.3	61%		18.3	24.6	ОК		
2	REHAB	40	40	0	0	0	80	40	64.4	81%		24.4	34.3	ОК		
2	MAFRAQ	80	80	80	0	0	240	160	123.7	52%		0.0	48.2	ОК		
2	SABHA	40	40	0	0	0	80	40	42.6	53%	56%	2.6	25.9	ОК		
2	DHULEIL	80	80	0	0	0	160	80	81.6	51%		1.6	15.5	ОК		
99	WAQAS	63	63	63	0	0	189	126	122.5	65%	-	0.0	25.1	ОК		
99	ISHTAFINA	40	45	63	0	0	148	85	97.6	66%	-	12.6	14.0	ОК		
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	-	0.0	2.6	ОК		
									Avera	ae	63%					

Table 29	BSP Analysis by	the BSP Grouping Method for IDECO in 2024

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP Grouping	BSP (Substation)		No	. of Ti	ל's		Capacity	Nº I Capacity	Peak Demar	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	IRBID	80	60	63	0	0	203	123	171.6	85%		48.6	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	166.0	69%	73%	6.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	103.6	65%		23.6	24.6	ОК	
2	REHAB	40	40	0	0	0	80	40	67.8	85%		27.8	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	130.3	54%	59%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	44.9	56%		4.9	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	86.0	54%		6.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	129.0	68%	-	3.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	102.8	69%	-	17.8	14.0	No	
99	SAFAWI	10	10	0	0	0	20	10	9.3	47%	-	0.0	2.6	ОК	
									Avera	ae	66%				

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of T	'R's		Capacity	м-т Сараску	Peak Demar	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63	0	0	203	123	171.6	85%		48.6	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	166.0	69%	73%	6.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	103.6	65%		23.6	24.6	ОК	
2	REHAB	40	40	0	0	0	80	40	67.8	85%		27.8	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	130.3	54%		0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	44.9	56%	59%	4.9	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	86.0	54%		6.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	129.0	68%	-	3.0	25.1	ОК	
99	ISHTAFINA	63	45	63	0	0	171	108	102.8	60%	-	0.0	14.0	ОК	BSP reinfocement (40→63)
99	SAFAWI	10	10	0	0	0	20	10	9.3	47%	-	0.0	2.6	ОК	
									Avera	ae	66%				

Table 30	BSP Analysis by the	e BSP Grouping Method	for IDECO in 2025

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency S	State Analysis
BSP Frouping	BSP (Substation)		No	of TI	ל's		Capacity	Nº I Capacity	Peak Demar	nd 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	IRBID	80	60	63	0	0	203	123	180.8	89%		57.8	57.6	No	
1	IRBID EAST	80	80	80	0	0	240	160	174.9	73%	77%	14.9	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	109.1	68%		29.1	24.6	No	
2	REHAB	40	40	0	0	0	80	40	71.5	89%		31.5	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	137.3	57%		0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	47.3	59%	62%	7.3	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	90.6	57%		10.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	135.9	72%	-	9.9	25.1	ОК	
99	ISHTAFINA	63	45	63	0	0	171	108	108.3	63%	-	0.3	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	9.8	49%	-	0.0	2.6	ОК	
									Avera	ae	69%				

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Frouping	BSP (Substation)		No	. of T	R's		Capacity	N=1 Capacity	Peak Demar		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63	0	0	203	123	150.3	74%		27.3	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	174.9	73%	68%	14.9	22.3	ОК	
1	HASAN IND	80	80	80	0	0	240	160	139.6	58%		0.0	24.6	ОК	Addition of 80MVA transformer
2	REHAB	40	40	0	0	0	80	40	71.5	89%		31.5	34.3	ок	
2	MAFRAQ	80	80	80	0	0	240	160	137.3	57%	62%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	47.3	59%	02%	7.3	25.9	ок	
2	DHULEIL	80	80	0	0	0	160	80	90.6	57%		10.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	135.9	72%	-	9.9	25.1	ОК	
99	ISHTAFINA	63	45	63	0	0	171	108	108.3	63%	-	0.3	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	9.8	49%	-	0.0	2.6	ОК	
									Avera	ae	65%				

Result of BSP Analysis for the NEPCO Practice 5.2

(1) BSP Analysis for JEPCO

						Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP ouping	BSP (Substation)		No	. of Ti	R's	Capacity		Peak Demar	nd 2016	Group	Load Transfer MVA	Possible Load	N-1 Observation	
rouping	(Substation)					[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80		240	160	120.9	50%		0.0	48.0	OK	
1	AMMANS	45	45	45		135	90	109.2	81%	76%	19.2	41.6	OK	
1	AMMAN S NEW	80	80			160	80	168.7	105%	70%	88.7	63.2	No	
1	ASHRFIA	63	63			126	63	104.1	83%		41.1	51.3	OK	
2	MANARAH	80	80	80		240	160	54.4	23%		0.0	49.0	OK	
2	SAHAB	63	63	63		189	126	138.1	73%	41%	12.1	25.0	OK	
2	MWQAR	80	80			160	80	51.5	32%		0.0	24.0	OK	
3	ABDALI	40	40	40		120	80	67.9	57%		0.0	18.0	OK	
3	ABDALI NEW	80	80			160	80	143.2	89%		63.2	25.0	No	
3	HIZAM	80	80	80		240	160		0%	450/	0.0	36.0	OK	NEPCO ongoing project
3	ZERQA	30	30	30	40	130	90	93.0	72%	45%	3.0	18.8	OK	
3	ZERQA TR5	63				63	0	24.0	38%		24.0	27.0	OK	
3	DHULEIL	80	80			160	80	61.3	38%		0.0	23.1	OK	
4	CITY CENTER	80	80	80		240	160	127.0	53%		0.0	111.6	OK	
4	MARQA	45	63	80		188	108	181.4	97%	64%	73.4	49.5	No	
4	TAREQ	80	80	80		240	160	121.3	51%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	198.2	83%		38.2	79.2	OK	
5	New BAYDER	80	80			160	80		0%		0.0	24.0	OK	NEPCO ongoing project
5	SALT	80	80			160	80	173.4	108%	68%	93.4	29.5	No	0 01 7
5	UNIVERSITY	80	80	80		240	160	178.6	74%		18.6	85.2	OK	
5	SUBEIHI	63	63	63		189	126	123.8	65%		0.0	5.2	OK	
6	QAIA	45	45			 90	45	14.5	16%		0.0	24.5	OK	
6	QAIA New	80	80			160	80	102.3	64%	45%	22.3	24.0	OK	
6	MADABA SOUTH	80	80	80		240	160	103.9	43%		0	35.0	OK	
						-		Avera	qe	57%		•		

Table 1 BSP Analysis by the NEPCO Practice for JEPCO in 2016

ii) After countermeasures

						Installed	N-1 Capacity	Norma	State An	alysis			Contingency :	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	₹'s	Capacity	ner capacity	Peak Deman	d 2016	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	ABDOON	80	80	80		240	160	120.9	50%		0.0	48.0	OK	
1	AMMANS	45	45	45		135	90	109.2	81%	68%	19.2	41.6	OK	
1	AMMAN S NEW	80	80	80		240	160	168.7	70%	00 /6	8.7	63.2	OK	80MVA
1	ASHRFIA	63	63			126	63	104.1	83%		41.1	51.3	OK	
2	MANARAH	80	80	80		240	160	54.4	23%		0.0	49.0	OK	
2	SAHAB	63	63	63		189	126	138.1	73%	41%	12.1	25.0	OK	
2	MWQAR	80	80			160	80	51.5	32%		0.0	24.0	OK	
3	ABDALI	40	40	40		120	80	67.9	57%		0.0	18.0	OK	
3	ABDALI NEW	80	80			160	80	79.2	49%		0.0	25.0	OK	To HIZAM 40%(64MVA)
3	HIZAM	80	80	80		240	160	120.4	50%	51%	0.0	36.0	OK	From ABDLAI NEW, Marqa
3	ZERQA	30	30	30	40	130	90	93.0	72%	5176	3.0	18.8	OK	
3	ZERQA TR5	63				63	0	24.0	38%		24.0	27.0	OK	
3	DHULEIL	80	80			160	80	61.3	38%		0.0	23.1	OK	
4	CITY CENTER	80	80	80		240	160	127.0	53%		0.0	111.6	OK	
4	MARQA	45	63	80		188	108	125.0	67%	56%	17.0	49.5	OK	To HIZAM 30%(56.4MVA)
4	TAREQ	80	80	80		240	160	121.3	51%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	198.2	83%		38.2	79.2	OK	
5	New BAYDER	80	80			160	80	96.0	60%		16.0	24.0	OK	From AMMAN SNEW, Salt
5	SALT	80	80			160	160	125.4	78%	73%	0.0	29.5	OK	To New Bayder 30%(48MVA)
5	UNIVERSITY	80	80	80		240	160	178.6	74%		18.6	85.2	OK	
5	SUBEIHI	63		63		189	126	123.8	65%		0.0	5.2	OK	
6	QAIA	45	45			90	45	14.5	16%		0.0	24.5	OK	
6	QAIA New	80	80			160	80	102.3	64%	45%	22.3	24.0	OK	
6	MADABA SOUTH	80	80	80		240	160	103.9	43%		0.0	35.0	OK	
								Avera	ge	56%				

*FUHBS, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP					Installed Capacity	N-1 Capacity		State Ar	alysis Group	Load Transfer MVA	1		State Analysis
rouping	(Substation)		NO	. of TF	rs	[MVA]	[MVA]	Peak Deman	% a 2017	Operating rate	Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	ABDOON	80	80	80		[MVA]	[MVA]	131.6	55%	(%)	Observation 0.0	48.0	ОК	
1	AMMANS	45	-	45		135	90	131.0	88%		28.7	40.0	OK	
1	AMMAN S NEW		45 80	40		160	90 80	183.2	115%	82%	103.2	63.2	No	
1	ASHRFIA	_	63			126	63	103.2	86%		45.4	51.3	OK	
2	MANARAH	80	-	80		240	160	58.8	24%		40.4	49.0	OK	
2	SAHAB	63	$ \longrightarrow $	63		189	126	145.0	77%	44%	19.0	25.0	OK	
2	MWQAR		80	00		160	80	55.5	35%	4470	0.0	24.0	OK	
3	ABDALI	40	-	40		120	80	73.8	61%		0.0	18.0	OK	
3	ABDALI NEW	-	80	.0		160	80	86.0	54%		6.0	25.0	OK	4
3	HIZAM	80		80		240	160	126.8	53%		0.0	36.0	OK	-
3	ZERQA		30	30	40	130	90	100.8	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63				63	0	26.0	41%		26.0	27.0	OK	
3	DHULEIL	80	80			160	80	67.2	42%		0.0	23.1	OK	
4	CITY CENTER	_	80	80		240	160	138.2	58%		0.0	111.6	OK	
4	MARQA	45	63	80		188	108	128.6	68%	59%	20.6	49.5	ОК	
4	TAREQ	80	80	80		240	160	130.5	54%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER	80	80			160	80	104.0	65%		24.0	24.0	No	
5	SALT	80	80			160	80	139.5	87%	79%	59.5	29.5	No	NEPCO Commiitted project
5	UNIVERSITY	80	80	80		240	160	194.9	81%	1	34.9	85.2	OK	
5	SUBEIHI	63	63	63		189	126	132.9	70%	1	6.9	5.2	No	
6	QAIA	45	45			90	45	16.0	18%		0.0	24.5	OK	
6	QAIA New	80	80			160	80	113.1	71%	49%	33.1	24.0	No	
6	MADABA SOUTH	80	80	80		240	160	111.9	47%		0	35.0	OK	
	•					·		Avera	ge	62%				•

Table 2BSP Analysis by the NEPCO Practice for JEPCO in 2017

ii) After countermeasures

						Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency S	State Analysis
BSP	BSP (Substation)		No	. of TF	ל's	Capacity		Peak Deman	d 2017	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	(,					[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	ABDOON	80	80	80		240	160	131.6	55%		0.0	48.0	OK	
1	AMMAN S	45	45	45		135	90	118.7	88%	73%	28.7	41.6	OK	
1	AMMAN S NEW	80	80	80		240	160	183.2	76%	13%	23.2	63.2	OK	
1	ASHRFIA	63	63			126	63	108.4	86%		45.4	51.3	OK	
2	MANARAH	80	80	80		240	160	58.8	24%		0.0	49.0	OK	
2	SAHAB	63	63	63		189	126	145.0	77%	44%	19.0	25.0	OK	
2	MWQAR	80	80			160	80	55.5	35%		0.0	24.0	OK	
3	ABDALI	40	40	40		120	80	73.8	61%		0.0	18.0	OK	
3	ABDALI NEW	80	80			160	80	86.0	54%		6.0	25.0	OK	
3	HIZAM	80	80	80		240	160	126.8	53%	55%	0.0	36.0	OK	
3	ZERQA	30	30	30	40	130	90	100.8	78%	55%	10.8	18.8	OK	
3	ZERQA TR5	63				63	0	26.0	41%		26.0	27.0	OK	
3	DHULEIL	80	80			160	80	67.2	42%		0.0	23.1	OK	
4	CITY CENTER	80	80	80		240	160	138.2	58%		0.0	111.6	OK	
4	MARQA	45	63	80		188	108	128.6	68%	59%	20.6	49.5	OK	
4	TAREQ	80	80	80		240	160	130.5	54%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	214.8	89%		54.8	79.2	OK	
5	New BAYDER	80	80			160	80	104.0	65%		24.0	24.0	No	
5	SALT	80	80	80		240	160	167.8	70%	74%	7.8	29.5	OK	From Subeihi
5	UNIVERSITY	80	80	80		240	160	194.9	81%		34.9	85.2	OK	
5	Subeihi	63	63	63		189	126	104.6	55%		0.0	5.2	OK	To Salt 15%(28.4MVA)
6	QAIA	45	45			90	45	16.0	18%		0.0	24.5	OK	
6	QAIA New	80	80	80		240	160	113.1	47%	42%	0.0	36.0	OK	80MVA
6	MADABA SOUTH	80	80	80		240	160	111.9	47%		0.0	35.0	OK	
								Avera	ge	58%				

BSP	BSP					Installed Capacity	N-1 Capacity		I State Ar	alysis Group	Load Transfer MVA	-	Contingency :	State Analysis
ouping	(Substation)		No	. of TF	l's			Peak Deman		Operating rate	Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
4	10000					[MVA]	[MVA]	[MVA]	%	(%)	Observation			
1	ABDOON	80		80	\vdash	240	160	138.4	58%		0.0	48.0	OK	
1	AMMAN S	45	-	45		135	90	125.2	93%	76%	35.2	41.6	OK	
1	AMMAN S NEW		80	80	<u> </u>	240	160	193.4	81%		33.4	63.2	OK	
_	ASHRFIA		63			126	63	109.4	87%		46.4	51.3	OK	
2	MANARAH		80	80		240	160	63.2	26%		0.0	49.0	OK	
2	SAHAB		63	63	\vdash	189	126	148.4	79%	46%	22.4	25.0	OK	
2	MWQAR	_	80			160	80	59.5	37%		0.0	24.0	OK	
3	ABDALI	40	-	40		120	80	77.9	65%		0.0	18.0	OK	
3	ABDALI NEW	80	<u> </u>			160	80	90.8	57%		10.8	25.0	OK	
3	HIZAM	80	<u> </u>	80		240	160	133.6	56%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	130	90	106.5	82%	46%	16.5	18.8	OK	
3	ZERQA TR5	63				63	0	27.4	44%		27.4	27.0	No	
3	New ZERQA		_	80		240	160		0%		0.0	36.0		NEPCO committed projet
3	DHULEIL	_	80			160	80	73.0	46%		0.0	23.1	OK	
4	CITY CENTER		80	80		240	160	147.3	61%		0.0	111.6	OK	
4	MARQA	45		80		188	108	128.6	68%	62%	20.6	49.5	OK	
4	TAREQ	_	80	80		240	160	136.3	57%		0.0	80.2	OK	
5	BAYADER	80	80	80		240	160	226.5	94%		66.5	79.2	OK	
5	New BAYDER	80	80			160	80	109.7	69%		29.7	24.0	No	
5	SALT	80	80	80		240	160	182.3	76%	78%	22.3	29.5	OK	
5	UNIVERSITY	80	80	80		240	160	208.2	87%		48.2	85.2	OK	
5	SUBEIHI	63	63	63		189	126	104.6	55%		0.0	5.2	OK	
6	QAIA	45	45			90	45	17.4	19%		0.0	24.5	OK	
6	QAIA New	80	80	80		240	160	122.9	51%	45%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80		240	160	118.9	50%		0	35.0	OK	
								Avera	qe	59%				

Table 3 BSP Analysis by the NEPCO Practice for JEPCO in 2018

ii) After countermeasures

	505						Installed	N-1 Capacity	Norma	State Ar	alysis			Contingency	State Analysis
BSP	BSP (Substation)		No	. of TF	₹'s		Capacity	n i oapacity	Peak Deman	d 2018	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	ABDOON	80	80	80			240	160	138.4	58%		0.0	48.0	OK	
1	AMMAN S	80	80	80			240	160	125.2	52%	67%	0.0	41.6	OK	105MVA
1	AMMAN S NEW	80	80	80			240	160	193.4	81%	0776	33.4	63.2	OK	
1	ASHRFIA	63	63				126	63	109.4	87%		46.4	51.3	OK	
2	MANARAH	80	80	80			240	160	63.2	26%		0.0	49.0	OK	
2	SAHAB	63	63	63			189	126	148.4	79%	46%	22.4	25.0	OK	
2	MWQAR	80	80			-	160	80	59.5	37%		0.0	24.0	OK	
3	ABDALI	40	40	40			120	80	77.9	65%		0.0	18.0	OK	
3	ABDALI NEW	80	80				160	80	90.8	57%		10.8	25.0	OK	
3	HIZAM	80	80	80			240	160	133.6	56%		0.0	36.0	OK	
3	ZERQA	30	30	30	40		130	90	80.5	62%	46%	0.0	18.8	OK	To New ZERQA(20%)
3	ZERQA TR5	63					63	0	14.8	24%		14.8	27.0	OK	To New ZERQA(20%)
3	New ZERQA	80	80	80			240	160	38.6	16%		0.0	36.0	OK	From ZERQA and New ZARQA
3	DHULEIL	80	80				160	80	73.0	46%		0.0	23.1	OK	
4	CITY CENTER	80	80	80			240	160	147.3	61%		0.0	111.6	OK	
4	MARQA	45	63	80			188	108	128.6	68%	62%	20.6	49.5	OK	
4	TAREQ	80	80	80			240	160	136.3	57%		0.0	80.2	OK	
5	BAYADER	80	80	80			240	160	190.5	79%		30.5	79.2	OK	
5	New BAYDER	80	80	80			240	159	145.7	61%		0.0	36.0	OK	80MVA
5	SALT	80	80	80			240	160	182.3	76%	72%	22.3	29.5	OK	
5	UNIVERSITY	80	80	80			240	160	208.2	87%		48.2	85.2	OK	
5	Subeihi	63	63	63			189	126	104.6	55%		0.0	5.2	OK	
6	QAIA	45	45				90	45	17.4	19%		0.0	24.5	OK	
6	QAIA New	80	80	80			240	160	122.9	51%	45%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80			240	160	118.9	50%		0.0	35.0	OK	
									Avera	qe	56%				

BSP	BSP							stalled	N-1 Capacity	Norma	I State Ar				Contingency St	tate Analysis
ouping	(Substation)		No	. of T	'R's		Ca	pacity	,	Peak Demar		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON	80	80	80	0	0) :	240	160	150.1	63%		0.0	48.0	OK	
1	AMMANS	80	80	80	0	0) :	240	160	135.4	56%	72%	0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0) :	240	160	209.2	87%	12/0	49.2	63.2	ОК	
1	ASHRFIA	63	63	0	0	0	1	126	63	113.7	90%		50.7	51.3	ОК	
2	MANARAH	80	80	80	0	0) :	240	160	69.1	29%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0		189	126	156.4	83%	49%	30.4	25.0	No	
2	MWQAR	80	80	0	0	0		160	80	63.4	40%		0.0	24.0	OK	
3	ABDALI	40	40	40	0	0		120	80	84.1	70%		4.1	18.0	OK	
3	ABDALI NEW	80	80	0	0	0		160	80	98.1	61%		18.1	25.0	ОК	
3	HIZAM	80	80	80	0	0) :	240	160	140.7	59%		0.0	36.0	ОК	
3	ZERQA	30	30	30	40	0		130	90	86.9	67%	49%	0.0	18.8	ОК	
3	ZERQA TR5	63	0	0	0	0)	63	0	16.0	25%		16.0	27.0	ОК	
3	New ZERQA	80	80	80	0	0) :	240	160	41.7	17%		0.0	36.0	ОК	
3	DHULEIL	80	80	0	0	0	1	160	80	80.3	50%		0.3	23.1	ОК	
4	CITY CENTER	80	80	80	0	0) :	240	160	161.5	67%		1.5	111.6	OK	
4	MARQA	45	63	80	0	0)	188	108	132.1	70%	66%	24.1	49.5	ОК	
4	TAREQ	80	80	80	0	0) :	240	160	146.3	61%		0.0	80.2	ОК	
5	BAYADER	80	80	80	0	0) :	240	160	206.1	86%		46.1	79.2	ОК	
5	New BAYDER	80	80	80	0	0		240	160	157.6	66%		0.0	36.0	OK	
5	SALT	80	80	80	0	0		240	160	202.5	84%	79%	42.5	29.5	No	
5	UNIVERSITY	80	80	80	0	0		240	160	227.6	95%		67.6	85.2	OK	
5	Subeihi	63	63	63	0	0	1	189	126	111.8	59%		0.0	5.2	OK	
6	QAIA	45	45	0	0	0)	90	45	19.4	22%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0		240	160	136.7	57%	50%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0) :	240	160	127.8	53%	1	0.0	35.0	OK	
	•				· ·				•	Avera	ae	61%			• •	

Table 4BSP Analysis by the NEPCO Practice for JEPCO in 2019

ii) After countermeasures

							Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of Ti	R's		Capacity	NºT Capacity	Peak Demar	d 2019	Group	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80	0	0	240	160	150.1	63%		0.0	48.0	OK	
1	AMMAN S	80	80	80	0	0	240	160	135.4	56%	66%	0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	209.2	87%	0078	49.2	63.2	OK	
1	ASHRFIA	63	63	80	0	0	206	63	113.7	55%		50.7	51.3	OK	80MVA
2	MANARAH	80	80	80	0	0	240	160	69.1	29%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	118.6	63%	43%	0.0	25.0	OK	
2	MWQAR	80	80	80	0	0	240	80	101.2	42%		21.2	36.0	OK	80MVA
3	ABDALI	40	40	40	0	0	120	80	84.1	70%		4.1	18.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	98.1	61%		18.1	25.0	OK	
3	HIZAM	80	80	80	0	0	240	160	140.7	59%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	86.9	67%	49%	0.0	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	16.0	25%		16.0	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	41.7	17%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	80.3	50%		0.3	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	161.5	67%		1.5	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	132.1	70%	66%	24.1	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	146.3	61%		0.0	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	206.1	86%		46.1	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	157.6	66%		0.0	36.0	OK	
5	SALT	80	80	80	0	0	240	160	154.5	64%	65%	0.0	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	179.6	75%	0070	19.6	85.2	OK	
5	New BSP	80	80	80			240	160	96.0	40%		0.0	36.0	OK	New BSP
5	SUBEIHI	63	63	63	0	0	189	126	111.8	59%		0.0	5.2	OK	
6	QAIA	45	45	0	0	0	90	45	19.4	22%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	136.7	57%	50%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	127.8	53%		0.0	35.0	OK	
									Avera	ge	56%				

BSP	505						Installed	N-1 Capacity	Norma	I State Ar	nalysis			Contingency St	tate Analysis
BSP ouping	BSP (Substation)		No	. of T	R's		Capacity	n'i capacity	Peak Demar	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer Detween BSFS
1	ABDOON	80	80	80	0	0	240	160	157.9	66%		0.0	48.0	OK	
1	AMMANS	80	80	80	0	0	240	160	142.4	59%	68%	0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	219.9	92%	0078	59.9	63.2	OK	
1	ASHRFIA	63	63	80	0	0	206	63	113.7	55%		50.7	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	72.7	30%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	121.2	64%	45%	0.0	25.0	OK	
2	MWQAR	80	80	80	0	0	240	80	107.5	45%		27.5	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	88.6	74%		8.6	18.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	103.3	65%		23.3	25.0	OK	
3	HIZAM	80	80	80	0	0	240	160	148.3	62%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	91.8	71%	52%	1.8	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	16.9	27%		16.9	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	44.0	18%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	86.2	54%		6.2	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	170.7	71%		10.7	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	131.4	70%	68%	23.4	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	152.1	63%		0.0	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	216.8	90%		56.8	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	165.8	69%		5.8	36.0	OK	
5	SALT	80	80	80	0	0	240	160	167.4	70%	70%	7.4	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	190.8	80%	10%	30.8	85.2	OK	
5	New BSP	80	80	80	-		240	160	118.8	49%		0.0	36.0	OK	
5	Subeihi	63	63	63	0	0	189	126	115.4	61%		0.0	5.2	OK	
6	QAIA	45	45	0	0	0	90	45	21.0	23%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	148.5	62%	53%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	134.8	56%]	0.0	35.0	OK	
									Avera	qe	60%				

Table 5BSP Analysis by the NEPCO Practice for JEPCO in 2020

							Installed	N-1 Capacity	Norma	I State Ar				Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of Ti	ל's		Capacity	Nº1 Capacity	Peak Demar	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	ABDOON	80	80	80	0	0	240	160	157.9	66%		0.0	48.0	OK	
1	AMMAN S	80	80	80	0	0	240	160	142.4	59%	66%	0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	183.9	77%	0078	23.9	63.2	OK	
1	ASHRFIA	80	80	80	0	0	240	160	149.7	62%		0.0	51.3	OK	34MVA
2	MANARAH	80	80	80	0	0	240	160	72.7	30%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	121.2	64%	45%	0.0	25.0	OK	
2	MWQAR	80	80	80	0	0	240	80	107.5	45%		27.5	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	88.6	74%		8.6	18.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	103.3	65%		23.3	25.0	OK	
3	HIZAM	80	80	80	0	0	240	160	148.3	62%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	91.8	71%	52%	1.8	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	16.9	27%		16.9	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	44.0	18%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	86.2	54%		6.2	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	170.7	71%		10.7	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	131.4	70%	68%	23.4	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	152.1	63%		0.0	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	144.8	60%		0.0	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	165.8	69%		5.8	36.0	OK	
5	SALT	80	80	80	0	0	240	160	119.4	50%		0.0	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	154.8	65%	60%	0.0	85.2	OK	
5	New BSP	80	80	80	0	0	240	160	118.8	49%	1	0.0	36.0	OK	
5	New BSP No2	80	80	80			240	160	156.0	65%	1	0.0	36.0	OK	New BSP
5	Subeihi	63	63	63	0	0	189	126	115.4	61%	1	0.0	5.2	OK	
6	QAIA	45	45	0	0	0	90	45	21.0	23%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	148.5	62%	53%	0.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	134.8	56%	l	0.0	35.0	OK	
				-		_			Avera	ae	57%				•

BSP	BSP						Installed Capacity	N-1 Capacity		I State Ar	nalysis Group	Load Transfer MVA		Contingency S	tate Analysis
ouping	(Substation)		No	. of TI	R's				Peak Dema		Operating rate	Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
					,		[MVA]	[MVA]	[MVA]	%	(%)	Observation			
1	ABDOON		80	80	0	0	240	160	169.6		-	9.6	48.0	OK	
1	AMMANS		80	80	0	0	240	160	152.6		70%	0.0	41.6	OK	
1	AMMAN S NEW		80	80	0	0	-	160	197.1	82%		37.1	63.2	OK	
1	ASHRFIA	_	80	80	0	0	240	160	153.9	64%		0.0	51.3	OK	
2	MANARAH	-	80	80	0	0	240	160	79.4		-	0.0	49.0	OK	
2	SAHAB		63	63	0	0	189	126	126.4	67%		0.4	25.0	OK	
2	MWQAR		80	80	0	0	240	80	113.9	47%		33.9	36.0	OK	
3	ABDALI		40	40	0	0		80	95.2	79%		15.2	18.0	OK	
3	ABDALI NEW		80	0	0	0	160	80	110.9	69%		30.9	25.0	No	
3	HIZAM	-	80	80	0	0	240	160	156.2	65%		0.0	36.0	OK	
3	ZERQA	30	<u> </u>	30	40	0	130	90	98.2	76%	56%	8.2	18.8	OK	
3	ZERQA TR5	63	-	0	0	0	63	0	18.1	29%		18.1	27.0	OK	
3	New ZERQA	-	80	80	0	0	240	160	47.1	20%		0.0	36.0	OK	
3	DHULEIL	_	80	0	0	0	160	80	93.5		-	13.5	23.1	OK	
4	CITY CENTER		80	80	0	0	240	160	184.9	77%	•	24.9	111.6	OK	
4	MARQA		63	80	0	0	188	108	133.5			25.5	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	162.1	68%	,	2.1	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	155.2	65%	ŀ	0.0	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	177.7	74%	,	17.7	36.0	OK	
5	SALT	80	80	80	0	0	240	160	131.7	55%	,	0.0	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	167.2	70%	64%	7.2	85.2	OK	
5	New BSP	80	80	80	0	0	240	160	128.3	53%	·	0.0	36.0	OK	
5	New BSP No2	80	80	80	0	0	240	160	168.5	70%	,	8.5	36.0	OK	
5	SUBEIHI	63	63	63	0	0	189	126	119.0	63%	,	0.0	5.2	OK	
6	QAIA	45	45	0	0	0	90	45	23.1	26%	,	0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	163.2	68%	58%	3.2	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	144.8	60%		0.0	35.0	OK	
									Avera	ige	61%				

Table 6BSP Analysis by the NEPCO Practice for JEPCO in 2021

ii) After countermeasures

BSP	BSP						Installed	N-1 Capacity	Norma	I State Ar				Contingency	State Analysis
BSP Frouping	BSP (Substation)		No	. of T	R's		Capacity		Peak Demar	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transiel Detween BSFS
1	ABDOON	80	80	80	0	0	240	160	169.6	71%		9.6	48.0	OK	
1	AMMAN S	80	80	80	0	0	240	160	152.6	64%	70%	0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	197.1	82%	10%	37.1	63.2	OK	
1	ASHRFIA	80	80	80	0	0	240	160	153.9	64%		0.0	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	79.4	33%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	126.4	67%	48%	0.4	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	113.9	47%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	95.2	79%		6.1	43.0	OK	Linkling of 33kV buses of Abdali and Abdali Ne
3	ABDALI NEW	80	80	0	0	0	160	80	110.9	69%					
3	HIZAM	80	80	80	0	0	240	160	156.2	65%		0.0	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	98.2	76%	56%	8.2	18.8	OK	
3	ZERQA TR5	63	<u> </u>	0	0	0	63	0	18.1	29%		18.1	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	47.1	20%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	93.5	58%		13.5	23.1	OK	
4	CITY CENTER		80	80	0	0	240	160	184.9	77%		24.9	111.6	OK	
4	MARQA		63	80	0	0		108	133.5	71%		25.5	49.5	OK	
4	TAREQ	_	80	80	0	0	-	160	162.1	68%		2.1	80.2	OK	
5	BAYADER		80	80	0	0	240	160	155.2	65%		0.0	79.2	OK	
5	New BAYDER	-	80	80	0	0		160	177.7	74%		17.7	36.0	OK	
5	SALT	-	80	80	0	0		160	131.7	55%		0.0	29.5	OK	
5	UNIVERSITY		80	80	0	0	-	160	167.2	70%		7.2	85.2	OK	
5	New BSP		80	80	0	0	-	160	128.3	53%		0.0	36.0	OK	
5	New BSP No2	80		80	0	0	-	160	168.5	70%	-	8.5	36.0	OK	
5	Subeihi	63	<u> </u>	63	0	0		126	119.0	63%		0.0	5.2	OK	
6	QAIA		45	0	0	0		45	23.1	26%		0.0	24.5	OK	
6	QAIA New	-	80	80	0	0	-	160	163.2	68%		3.2	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	144.8	60%		0.0	35.0	OK	
									Avera	ge	61%				

BSP	BSP						Installed	N-1 Capacity		I State Ar	, í			Contingency St	tate Analysis
ouping	(Substation)		No	. of T	R's		Capacity		Peak Demar		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
			,		,		[MVA]	[MVA]	[MVA]	%	(%)	Observation			
1	ABDOON	-	80	80	+	0	240	160	177.4	74%		17.4	48.0	OK	
1	AMMAN S		80	80	<u>+ -</u>		240	160	159.6	66%	73%	0.0	41.6	OK	
1	AMMAN S NEW		80	80	0	0	240	160	206.1	86%		46.1	63.2	OK	
1	ASHRFIA	_	80	80	0	0	240	160	153.9	64%		0.0	51.3	OK	
2	MANARAH		80	80	0	0	240	160	83.8	35%		0.0	49.0	OK	
2	SAHAB		63	63	0	0	189	126	128.1	68%	50%	2.1	25.0	OK	
2	MWQAR	_	80	80	0	0	240	160	120.2	50%		0.0	36.0	OK	
3	ABDALI	40		40	0	0	120	80	99.3	83%		15.1	43.0	OK	
3	ABDALI NEW	80	80	0	0	0	160	80	115.8	72%					
3	HIZAM	80	80	80	0	0	240	160	164.5	69%		4.5	36.0	ОК	
3	ZERQA	30	30	30	40	0	130	90	102.5	79%	58%	12.5	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	18.9	30%		18.9	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	49.2	20%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	100.8	63%		20.8	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	195.0	81%		35.0	111.6	ОК	
4	MARQA	45	63	80	0	0	188	108	132.8	71%	74%	24.8	49.5	ОК	
4	TAREQ	80	80	80	0	0	240	160	167.9	70%		7.9	80.2	ОК	
5	BAYADER	80	80	80	0	0	240	160	162.3	68%		2.3	79.2	ОК	
5	New BAYDER	80	80	80	0	0	240	160	185.9	77%		25.9	36.0	ОК	
5	SALT	80	80	80	0	0	240	160	141.4	59%		0.0	29.5	ОК	
5	UNIVERSITY	80	80	80	0	0	240	160	176.4	73%	66%	16.4	85.2	OK	
5	New BSP	80	80	80	0	0	240	160	168.5	70%	1	8.5	36.0	OK	
5	New BSP No2	80	80	80	0	0	240	160	119.0	50%	1	0.0	36.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	122.6	65%	1	0.0	5.2	ОК	
6	QAIA	45	45	0	0	0	90	45	24.9	28%		0.0	24.5	ОК	
6	QAIA New	80	80	80	0	0	240	160	176.0	73%	62%	16.0	36.0	ОК	
6	MADABA SOUTH	80	80	80	0	0	240	160	150.8	63%	1	0.0	35.0	ОК	
-						,			Avera		64%				

Table 7BSP Analysis by the NEPCO Practice for JEPCO in 2022

ii) After countermeasures

BSP	BSP						Installed	N-1 Capacity		I State Ar	, <i>`</i>			Contingency S	State Analysis
rouping	(Substation)		No	. of Ti	₹'s		Capacity		Peak Demar	nd 2022	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON	80	80	80	0	0	240	160	177.4	74%		17.4	48.0	OK	
1	AMMAN S	80	80	80	0	0	240	160	159.6	66%		0.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	206.1	86%	73%	46.1	63.2	OK	
							0	0		#DIV/0!		0.0	0.0	OK	
1	ASHRFIA	80	80	80	0	0	240	160	153.9	64%		0.0	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	83.8	35%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	128.1	68%	50%	2.1	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	120.2	50%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	99.3	83%		15.1	43.0	ОК	
3	ABDALI NEW	80	80	0	0	0	160	80	115.8	72%					
3	HIZAM	80	80	80	0	0	240	160	164.5	69%		4.5	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	102.5	79%	58%	12.5	18.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	18.9	30%		18.9	27.0	OK	
3	New ZERQA	80	80	80	0	0	240	160	49.2	20%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	0	160	80	100.8	63%		20.8	23.1	OK	
4	CITY CENTER	80	80	80	0	0	240	160	195.0	81%		35.0	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	132.8	71%	74%	24.8	49.5	OK	
4	TAREQ	80	80	80	0	0	240	160	167.9	70%		7.9	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	162.3	68%		2.3	79.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	185.9	77%		25.9	36.0	OK	
5	SALT	80	80	80	0	0	240	160	141.4	59%		0.0	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	176.4	73%	66%	16.4	85.2	OK	
5	New BSP	80	80	80	0	0	240	160	168.5	70%		8.5	36.0	ОК	
5	New BSP No2	80	80	80	0	0	240	160	119.0	50%		0.0	36.0	OK	
5	Subeihi	63	63	63	0	0	189	126	122.6	65%		0.0	29.5	OK	
6	QAIA	45	45	0	0	0	90	45	24.9	28%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	176.0	73%	62%	16.0	36.0	OK	
6	MADABA SOUTH	80	80	80	0	0	240	160	150.8	63%	1	0.0	35.0	OK	
									Avera	ae	64%			• •	

							Insta	lled	N-1 Capacity	Norma	I State Ar	alysis			Contingency S	tate Analysis
BSP brouping	BSP (Substation)		No	. of T	R's		Capa	city	N-1 Capacity	Peak Dema	nd 2023	Group	Load Transfer MVA	Possible Load	N-1 Observation	Land Transford Later DODa
	()						[MV	[A]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80	0	C) 24	0	160	189.1	79%		29.1	48.0	ОК	
1	AMMANS	80	80	80	0	C	24	0	160	171.0	71%		11.0	41.6	ОК	
1	AMMAN S NEW	80	80	80	0	C	24	0	160	220.9	92%	77%	60.9	63.2	OK	
1	New BSP	0	0	0	0	C	0 0		0	0.0	#DIV/0!		0.0	0.0	OK	
1	ASHRFIA	80	80	80	0	C	24	0	160	158.1	66%		0.0	51.3	OK	
2	MANARAH	80	80	80	0	C	24	0	160	90.4	38%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	C) 18	9	126	133.3	71%	52%	7.3	25.0	OK	
2	MWQAR		80	80	÷	C	24	0	160	126.5	53%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	C) 12	0	80	106.5	89%		30.8	43.0	OK	
3	ABDALI NEW	80	80	0	0	C	16	0	80	124.2	78%					
3	HIZAM	80	80	80	0	C	24	0	160	173.3	72%		13.3	36.0	OK	
3	ZERQA	30	30	30	40	C) 13	0	90	110.0	85%	63%	20.0	18.8	No	
3	ZERQA TR5	63	0	0	0	C	63	3	0	20.3	32%		20.3	27.0	OK	
3	New ZERQA	80	80	80	0	C	24	0	160	52.8	22%		0.0	36.0	OK	
3	DHULEIL	80	80	0	0	C	16	0	80	109.5	68%		29.5	23.1	No	
4	CITY CENTER	80	80	80	0	C	24	0	160	211.3	88%		51.3	111.6	OK	
4	MARQA	45	63	80	0	C) 18	8	108	134.9	72%	78%	26.9	49.5	OK	
4	TAREQ	80	80	80	0	C	24	0	160	177.9	74%		17.9	80.2	OK	
5	BAYADER	80	80	80	0	C	24	0	160	173.8	72%		13.8	79.2	OK	
5	New BAYDER	80	80	80	0	C	24	0	160	199.1	83%		39.1	36.0	No	
5	SALT	80	80	80	0	C	24	0	160	155.9	65%		0.0	29.5	OK	
5	UNIVERSITY	80	80	80	0	C	24	0	160	190.8	79%	71%	30.8	85.2	OK	
5	New BSP	80	80	80	0	C	24	0	160	182.2	76%		22.2	36.0	OK	
5	New BSP No2	80	80	80	0	C	24	0	160	128.7	54%		0.0	36.0	OK	
5	Subeihi	63	63	63	0	C) 18	9	126	129.8	69%		3.8	29.5	OK	
6	QAIA	45	45	0	0	C	90)	45	27.4	30%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	C	24	0	160	193.7	81%	67%	33.7	36.0	OK	
6	MADABA SOUTH	80	80	80	0	C	24	0	160	161.8	67%		1.8	35.0	OK	

Table 8BSP Analysis by the NEPCO Practice for JEPCO in 2023

*FUHBS, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

ii)	After	countermeasures
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BSP	BSP						Installed	N-1 Capacity	Norma	I State Ar				Contingency	State Analysis
BSP Frouping	BSP (Substation)		No	. of Ti	ל's		Capacity	Gapaony	Peak Demar	nd 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	ABDOON	80	80	80	0	0	240	160	165.1	69%		5.1	48.0	OK	
1	AMMAN S	80	80	80	0	0	240	160	171.0	71%		11.0	41.6	OK	
1	AMMAN S NEW	80	80	80	0	0	240	160	172.9	72%	63%	12.9	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	72.0	30%		0.0	36.0	OK	New BSP
1	ASHRFIA	63	63	80	0	0	206	126	158.1	77%		32.1	51.3	OK	
2	MANARAH	80		80	0	0	240	160	90.4	38%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	133.3	71%	52%	7.3	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	126.5	53%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	106.5	89%		30.8	43.0	OK	
3	ABDALI NEW	80		0	0	0	160	80	124.2	78%					
3	HIZAM	80		80	0	0	240	160	173.3			13.3	36.0	OK	
3	ZERQA	30	30	30	40	0	130	90	110.0	85%	58%	0.3	45.8	OK	Linkling of 33kV buses of Zarqa and Zarqa
3	ZERQA TR5	63	-	0	0	0	63	0	20.3	32%					
3	New ZERQA	80	80	80	0	0	240	160	52.8	22%		0.0	36.0	OK	
3	DHULEIL	80		80	0	0	240	160	109.5	46%		0.0	23.1	OK	80MVA
4	CITY CENTER	80	80	80	0	0	240	160	211.3			51.3	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	134.9		78%	26.9	49.5	OK	
4							0	0		#DIV/0!	10/0	0.0	0.0	OK	
4	TAREQ	80		80	0	0	240	160	177.9	74%		17.9	80.2	OK	
5	BAYADER	_	80	80	0	0	240	160	173.8			0.0	115.2	OK	Linkling of 33kV buses of Bayader New and ol
5	New BAYDER		80	80	0	0	240	160	199.1	83%					
5	SALT		80	80	0	0	240	160	155.9			0.0	29.5	OK	
5	UNIVERSITY	_	80	80	0	0	240	160	190.8	79%	71%	30.8	85.2	OK	
5	New BSP	80	<u> </u>	80	0	0	240	160	182.2	76%	ļ	22.2	36.0	OK	
5	New BSP No2	80		80	0	0	240	160	128.7	54%		0.0	36.0	OK	
5	Subeihi	63		63	0	0	189	126	129.8			3.8	29.5	OK	
6	QAIA	45	<u> </u>	0	0	0	90	45	27.4	30%	ļ	0.0	24.5	OK	
6	QAIA New		80	80	0	0	240	160	193.7	81%	67%	33.7	36.0	ОК	
6	MADABA SOUTH	80	80	80	0	0	240	160	161.8	67%		1.8	35.0	OK	
									Avera	qe	65%				

	505						Installed	N-1 Capacity	Norma	al State Ar				Contingency S	State Analysis
BSP Grouping	BSP (Substation)		No	. of Ti	ל's		Capacity	n'i capacity	Peak Dema	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansier between DOI 3
1	ABDOON	80	80	80	0	0	240	160	177.0	74%		17.0	48.0	OK	
1	AMMANS	80	80	80	0	0	240	160	183.3	76%		23.3	41.6	OK	
1	AMMAN S NEW	80		80	0	0	240	160	185.3	77%	67%	25.3	63.2	OK	
1	New BSP	80	80	80	0	0	240	160	77.2	32%		0.0	36.0	OK	
1	ASHRFIA	63	63	80	0	0	206	126	162.3	79%		36.3	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	97.7	41%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	0	189	126	138.5	73%	56%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	136.0	57%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	113.8	95%		46.4	43.0	No	
3	ABDALI NEW	80	80	0	0	0	160	80	132.7	83%					
3	HIZAM	80	80	80	0	0	240	160	182.6	76%		22.6	36.0	ОК	
3	ZERQA	30	30	30	40	0	130	90	117.5	90%	62%	9.2	45.8	OK	
3	ZERQA TR5	63	0	0	0	0	63	0	21.6	34%					
3	New ZERQA	80	80	80	0	0	240	160	56.4	23%	,	0.0	36.0	OK	
3	DHULEIL	80	80	80	0	0	240	160	119.7	50%		0.0	23.1	ОК	
4	CITY CENTER	80	80	80	0	0	240	160	228.6	95%		68.6	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	137.1	73%	0.00/	29.1	49.5	OK	
4	New BSP	0	0	0	0	0	0	0	0.0	#DIV/0!	83%	0.0	0.0	ОК	
4	TAREQ	80	80	80	0	0	240	160	188.7	79%		28.7	80.2	OK	
5	BAYADER	80	80	80	0	0	240	160	185.9	77%		0.0	115.2	ОК	
5	New BAYDER	80	80	80	0	0	240	160	212.9	89%					
5	SALT	80	80	80	0	0	240	160	171.7	72%	,	11.7	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	206.4	86%	76%	46.4	85.2	OK	
5	NEW BSP	80	80	80	0	0	240	160	187.3	78%	,	27.3	36.0	OK	
5	New BSP N02	80	80	80	0	0	240	160	139.3	58%		0.0	36.0	OK	
5	Subeihi	63	63	63	0	0	189	126	133.4	71%		7.4	29.5	OK	
6	QAIA	45	45	0	0	0	90	45	30.2	34%		0.0	24.5	OK	
6	QAIA New	80	80	80	0	0	240	160	213.4	89%	73%	53.4	36.0	No	
6	MADABA SOUTH	80	80	80	0	0	240	160	173.8	72%	1	13.8	35.0	OK	
				•					Avera	ige	70%			· ·	

Table 9BSP Analysis by the NEPCO Practice for JEPCO in 2024

ii) After countermeasures

BSP	BSP							Installed	N-1 Capacity	Norma	I State Ar				Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of T	R's			Capacity	N Foupacity	Peak Demar	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
5								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	ABDOON	80	80	80	0	-	0	240	160	177.0	74%		17.0	48.0	OK	
1	AMMAN S	80	80	80	0	-	0	240	160	183.3	76%		23.3	41.6	OK	
1	AMMAN S NEW	80	80	80	0	-	0	240	160	185.3	77%	67%	25.3	63.2	OK	
1	New BSP	80	80	80	0	-	0	240	160	77.2	32%		0.0	36.0	OK	
1	ASHRFIA	63	63	80	0		0	206	126	162.3	79%		36.3	51.3	OK	
2	MANARAH	80	80	80	0	1	0	240	160	97.7	41%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	1	0	189	126	138.5	73%	56%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	-	0	240	160	136.0	57%		0.0	36.0	OK	
3	ABDALI	80	80	80	0	1	0	240	160	113.8	47%		0.0	43.0	OK	120MVA
3	ABDALI NEW	80	80	0	0		0	160	80	132.7	83%]
3	HIZAM	80	80	80	0		0	240	160	182.6	76%		22.6	36.0	OK	
3	ZERQA	80	80	30	40)	0	230	150	117.5	51%	53%	0.0	45.8	OK	100MVA
3	ZERQA TR5	63	0	0	0	-	0	63	0	21.6	34%					
3	New ZERQA	80	80	80	0	-	0	240	160	56.4	23%		0.0	36.0	OK	
3	DHULEIL	80	80	80	0		0	240	160	119.7	50%		0.0	23.1	OK	
4	CITY CENTER	80	80	80	0	-	0	240	160	180.6	75%		20.6	111.6	OK	
4	MARQA	45	63	80	0	-	0	188	108	137.1	73%	61%	29.1	49.5	OK	
4	New BSP	80	80	80	0	-	0	240	160	72.0	30%	0176	0.0	36.0	OK	New BSP
4	TAREQ	80	80	80	0	-	0	240	160	164.7	69%		4.7	80.2	OK	
5	BAYADER	80	80	80	0	-	0	240	160	185.9	77%		0.0	115.2	OK	
5	New BAYDER	80	80	80	0		0	240	160	212.9	89%	1				
5	SALT	80	80	80	0		0	240	160	171.7	72%		11.7	29.5	OK]
5	UNIVERSITY	80	80	80	0		0	240	160	206.4	86%	76%	46.4	85.2	OK]
5	NEW BSP	80	80	80	0	-	0	240	160	187.3	78%		27.3	36.0	OK]
5	New BSP No2	80	80	80				240	160	139.3	58%		0.0	36.0	OK]
5	Subeihi	63	63	63	0	-	0	189	126	133.4	71%		7.4	29.5	OK]
6	QAIA	45	45	80	0		0	170	90	66.2	39%		0.0	24.5	OK	80MVA
6	QAIA New	80	80	80	0	1	0	240	160	177.4	74%	64%	17.4	36.0	OK	
6	MADABA SOUTH	80	80	80	0	-	0	240	160	173.8	72%	,	13.8	35.0	OK]
										Avera	ae	63%				•

*FUHBS, HASHIMYA and MWQAR IND are excluded due to an exclusive use for large industries.

BSP	BSP						Installed	N-1 Capacity	Norma	al State Ar				Contingency S	tate Analysis
ouping	(Substation)		No	. of Ti	R's		Capacity	n'i capacity	Peak Dema	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer Detween DSF3
1	ABDOON	-	80	80	0	0	240	160	177.0	74%		17.0	48.0	ОК	
1	AMMANS		80	80	0	0	240	160	183.3		-	23.3	41.6	OK	
1	AMMAN S NEW		80	80	0	0	240	160	185.3		67%	25.3	63.2	OK	
1	New BSP	-	80	80	0	0	240	160	77.2	32%		0.0	36.0	ОК	
1	ASHRFIA	63	63	80	0	0	206	126	162.3	79%		36.3	51.3	OK	
2	MANARAH	80	80	80	0	0	240	160	97.7	41%		0.0	49.0	ОК	
2	SAHAB	63	63	63	0	0	189	126	138.5	73%	56%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	0	240	160	136.0	57%		0.0	36.0	OK	
3	ABDALI	40	40	40	0	0	120	80	113.8	95%		46.4	43.0	No	
3	ABDALI NEW	80	80	0	0	0	160	80	132.7	83%					
3	HIZAM	80	80	80	0	0	240	160	182.6	76%		22.6	36.0	ОК	
3	ZERQA	30	30	30	40	0	130	90	117.5	90%	62%	9.2	45.8	ОК	
3	ZERQA TR5	63	0	0	0	0	63	0	21.6	34%					
3	New ZERQA	80	80	80	0	0	240	160	56.4	23%		0.0	36.0	ОК	
3	DHULEIL	80	80	80	0	0	240	160	119.7	50%		0.0	23.1	ОК	
4	CITY CENTER	80	80	80	0	0	240	160	228.6	95%		68.6	111.6	OK	
4	MARQA	45	63	80	0	0	188	108	137.1	73%		29.1	49.5	ОК	
4	New BSP	0	0	0	0	0	0	0	0.0	#DIV/0!	83%	0.0	0.0	ОК	
4	TAREQ	80	80	80	0	0	240	160	188.7	79%		28.7	80.2	ОК	
5	BAYADER	80	80	80	0	0	240	160	185.9	77%		0.0	115.2	OK	
5	New BAYDER	80	80	80	0	0	240	160	212.9	89%					
5	SALT	80	80	80	0	0	240	160	171.7	72%	1	11.7	29.5	OK	
5	UNIVERSITY	80	80	80	0	0	240	160	206.4	86%	76%	46.4	85.2	OK	
5	NEW BSP	80	80	80	0	0	240	160	187.3	78%	ţ.	27.3	36.0	ОК	
5	New BSP N02	80	80	80	0	0	240	160	139.3	58%	t	0.0	36.0	ОК	
5	SUBEIHI	63	63	63	0	0	189	126	133.4	71%	İ	7.4	29.5	ОК	
6	QAIA	45	45	0	0	0	90	45	30.2	34%		0.0	24.5	ОК	
6	QAIA New	80	80	80	0	0	240	160	213.4	89%	73%	53.4	36.0	No	
6	MADABA SOUTH	80	80	80	0	0	240	160	173.8	72%	t	13.8	35.0	ОК	
-		-							Avera	ne	70%				

Table 10BSP Analysis by the NEPCO Practice for JEPCO in 2025

ii) After countermeasures

BSP rouping	BSP							Installed	N-1 Capacity	Norma	I State Ar	laiysis			Contingency	State Analysis
	(Substation)		No	o. of T	'R's			Capacity	N=1 Capacity	Peak Demar	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	ABDOON	80	80	80	0	()	240	160	177.0	74%		17.0	48.0	OK	
1 /	AMMAN S	80	80	80	0	(C	240	160	183.3	76%		23.3	41.6	ОК	
1	AMMAN S NEW	80	80	80	0	()	240	160	185.3	77%	67%	25.3	63.2	OK	
1 '	New BSP	80	80	80	0	(0	240	160	77.2	32%		0.0	36.0	OK	
1	ASHRFIA	63	63	80	0	(C	206	126	162.3	79%		36.3	51.3	OK	
2	MANARAH	80	80	80	0	(C	240	160	97.7	41%		0.0	49.0	OK	
2	SAHAB	63	63	63	0	(С	189	126	138.5	73%	56%	12.5	25.0	OK	
2	MWQAR	80	80	80	0	(C	240	160	136.0	57%		0.0	36.0	OK	
3	ABDALI	80	80	80	0	(C	240	160	113.8	47%		0.0	43.0	ОК	120MVA
3	ABDALI NEW	80	80	0	0	(С	160	80	132.7	83%					
3 1	HIZAM	80	80	80	0	(0	240	160	182.6	76%		22.6	36.0	OK	
3	ZERQA	80	80	30	40) ()	230	150	117.5	51%	53%	0.0	45.8	OK	100MVA
3	ZERQA TR5	63	0	0	0	(С	63	0	21.6	34%					
3 '	New ZERQA	80	80	80	0	(C	240	160	56.4	23%		0.0	36.0	OK	
3 '	DHULEIL	80	80	80	0	(0	240	160	119.7	50%		0.0	23.1	OK	
4 (CITY CENTER	80	80	80	0	(0	240	160	180.6	75%		20.6	111.6	OK	
4	MARQA	45	63	80	0	(C	188	108	137.1	73%	61%	29.1	49.5	OK	
4	New BSP	80	80	80	0	(0	240	160	72.0	30%	01%	0.0	36.0	OK	New BSP
4	TAREQ	80	80	80	0	()	240	160	164.7	69%		4.7	80.2	OK	
5 '	BAYADER	80	80	80	0	(0	240	160	185.9	77%		0.0	115.2	OK	
5 י	New BAYDER	80	80	80	0	(0	240	160	212.9	89%					
5	SALT	80	80	80	0	(0	240	160	171.7	72%		11.7	29.5	OK	
5	UNIVERSITY	80	80	80	0	()	240	160	206.4	86%	76%	46.4	85.2	OK]
5 1	NEW BSP	80	80	80	0	(D	240	160	187.3	78%		27.3	36.0	ОК	
5	New BSP No2	80	80	80		I		240	160	139.3	58%		0.0	36.0	OK	
5	SUBEIHI	63	63	63	0	(0	189	126	133.4	71%		7.4	29.5	OK	
6	QAIA	45	45	80	0	(С	170	90	66.2	39%		0.0	24.5	OK	80MVA
6	QAIA New	80	80	80	0	(С	240	160	177.4	74%	64%	17.4	36.0	OK	
6	MADABA SOUTH	80	80	80	0	(2	240	160	173.8	72%		13.8	35.0	OK	1
										Avera	ge	63%				

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ntingency State A	nalysis
BSP rouping	BSP (Substation)		No.	of T	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2016	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	(,						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	AQ A2	40	40	63	63		206	143	69.7	34%		0.0	25.0	OK	
1	AQ IND	80	80				160	80	31.7	20%	23%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80		286	206	46.3	16%		0.0	10.0	ОК	
2	QUWEIRA	16	45		_		61	16	16.0	26%	27%	0.0	6.0	OK	
2	DESI	63	63				126	63	34.5	27%	21 70	0.0	6.0	ОК	
3	EL_HASA	25	25				50	25	25.9	52%	39%	0.9	5.0	OK	
3	RASHADIA	16	40	40			96	56	31.0	32%	39%	0.0	5.0	OK	
4	KARAK	16	16	25			57	32	45.4	80%	34%	13.4	10.0	No	
4	KARAK SOUTH	80	80				160	80	28.9	18%	34 %	0.0	10.0	ОК	
5	SUBEIHI	63	63	63			189	126	122.1	65%		0.0	6.0	OK	
5	SWEIMEH	80	80	80			240	160	78.7	33%	55%	0.0	3.0	ОК	
5	ISHTAFINA	40	45				85	40	67.8	80%	55%	27.8	3.0	No	
5	WAQAS	63	63				126	63	85.1	68%		22.1	3.0	No	
99	QATRANA	10	10	16			36	20	19.7	55%	55%	0.0	0.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	60.4	30%	30%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	50.6	29%	29%	0.0	0.0	ОК	
99	AZRAQ	25	25				50	25	16.2	32%	32%	0.0	0.0	OK	
99	SAFAWI	10					10	0	6.2	62%	62%	6.2	0.0	No	
99	RWESHID	10					10	0	4.3	43%	43%	4.3	0.0	No	
99	RESHA	12.5	12.5				25	12.5	3.8	15%	15%	0.0	0.0	ОК	
									Avera	ae	37%				

Table 11BSP Analysis by the NEPCO Practice for EDCO in 2016

ii) After countermeasures

								Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP Brouping	BSP (Substation)		No	o. o	f TR'	s		Capacity	Nº1 Capacity	Peak Demar	nd 2016	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load transfer between Bors
1	AQ A2	40	40	6	63	63		206	143	69.7	34%		0.0	25.0	OK	
1	AQ IND	80	80					160	80	31.7	20%	23%	0.0	15.0	OK	
1	AQTH & NEW	63	63	8	80	30		286	206	46.3	16%		0.0	10.0	OK	
2	QUWEIRA	16	45					61	16	16.0	26%	27%	0.0	6.0	OK	
2	DESI	63	63		Τ			126	63	34.5	27%	21%	0.0	6.0	OK	
3	EL_HASA	25	25					50	25	25.9	52%	39%	0.9	5.0	OK	
3	RASHADIA	16	40	4	10			96	56	31.0	32%	39%	0.0	5.0	OK	
4	KARAK	63	63	2	25			151	88	45.4	30%	24%	0.0	10.0	OK	94MVA
4	KARAK SOUTH	80	80		Τ			160	80	28.9	18%	24%	0.0	10.0	OK	From Karak
5	SUBEIHI	63	63	6	33			189	126	122.1	65%		0.0	6.0	OK	
5	SWEIMEH	80	80	8	80			240	160	78.7	33%	50%	0.0	3.0	OK	
5	ISHTAFINA	40	45	6	3			148	85	67.8	46%	50%	0.0	3.0	OK	NEPCO Committed Project
5	WAQAS	63	63					126	63	85.1	68%		22.1	3.0	No	NEPCO Committed Project
99	QATRANA	10	10	1	6			36	20	19.7	55%	55%	0.0	0.0	OK	
99	GHORSAFI	40	40	4	10	40	40	200	160	60.4	30%	30%	0.0	0.0	OK]
99	MAAN	16	16	1	6	63	63	174	111	50.6	29%	29%	0.0	0.0	OK	
99	AZRAQ	25	25					50	25	16.2	32%	32%	0.0	0.0	OK	
99	SAFAWI	10						10	0	6.2	62%	62%	6.2	0.0	No	NEPCO Committed Project
99	RWESHID	10			I			10	0	4.3	43%	43%	4.3	0.0	No	NEPCO Committed Project
99	RESHA	12.5	12.5					25	12.5	3.8	15%	15%	0.0	0.0	OK	
										Avera	ge	36%				

Table 12	BSP Analysis by the NEPCO Practice for EDCO in 2017
14010 12	

							Installed		Norm	al State Ana	alysis		Co	ntingency State A	nalysis
BSP Grouping	BSP (Substation)		No	. of T	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2017	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	73.5	36%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	33.4	21%	24%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	48.7	17%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	16.9	28%	28%	0.9	6.0	OK	
2	DESI	63	63	0	0	0	126	63	36.4	29%	28%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	27.3	55%	41%	2.3	5.0	OK	
3	RASHADIA	16	40	40	0	0	96	56	32.6	34%	41%	0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	47.8	32%	25%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	30.4	19%	25%	0.0	10.0	OK	
5	SUBEIHI	63	63	63	0	0	189	126	128.6	68%		2.6	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	82.9	35%	53%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	0	0	148	85	71.4	48%	53%	0.0	3.0	OK	
5	WAQAS	63	63	0	0	0	126	63	89.6	71%		26.6	3.0	No	
99	QATRANA	10	10	16	0	0	36	20	20.8	58%	55%	0.8	0.0	No	
99	GHORSAFI	40	40	40	40	40	200	160	63.6	32%	30%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	53.3	31%	31%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	17.1	34%	34%	0.0	0.0	ОК	
99	SAFAWI	10	0	0	0	0	10	0	6.5	65%	65%	6.5	0.0	No	
99	RWESHID	10	0	0	0	0	10	0	4.5	45%	45%	4.5	0.0	No	
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.0	16%	16%	0.0	0.0	OK	
	•								Avera	ge	37%				

							Installed	N-1 Capacity	Norm	al State Ana	ilysis		Co	ontingency State A	Analysis
BSP Brouping	BSP (Substation)		No	. of T	'R's		Capacity	in roupdony	Peak Demar	nd 2017	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	73.5	36%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	33.4	21%	24%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80	0	286	206	48.7	17%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	61	16	16.9	28%	28%	0.9	6.0	OK	
2	DESI	63	63	0	0	0	126	63	36.4	29%	20%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	27.3	55%	0%	2.3	5.0	OK	
3	RASHADIA	16	40	40	0	0	96	56	32.6	34%	0%	0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	47.8	32%	25%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	30.4	19%	2378	0.0	10.0	OK	From Qatrana
5	SUBEIHI	63	63	63	0	0	189	126	128.6	68%		2.6	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	82.9	35%	49%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	0	0	148	85	71.4	48%	4376	0.0	3.0	OK	
5	WAQAS	63	63	63	0	0	189	126	89.6	47%		0.0	3.0	OK	NEPCO Committed Project
4	QATRANA	63	10	16	0	0	89	26	20.8	23%	-	0.0	0.0	OK	53MVA
99	GHORSAFI	40	40	40	40	40	200	160	63.6	32%	32%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	53.3	31%	31%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	17.1	34%	34%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0	20	10	6.5	32%	32%	0.0	0.0	OK	NEPCO Committed Project
99	RWESHID	10	10	0	0	0	20	10	4.5	23%	23%	0.0	0.0	OK	NEPCO Committed Project
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.0	16%	16%	0.0	0.0	OK	
									Avera	ge	27%				

Table 13	BSP Analysis by the NEPCO Practice for EDCO in 2018
	Doi 7 marysis by the IVEL CO I factice for EDCO in 2010

								Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Brouping	BSP (Substation)		No	o. of '	TR's			Capacity	Nº1 Capacity	Peak Deman	nd 2018	Group	Load Transfer MVA	Possible Load	N-1 Observation	Lood Transford Internet DOD
	(,							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	3 6	3 (C	206	143	77.4	38%		0.0	25.0	OK	
1	AQ IND	80	80	0	0		C	160	80	35.2	22%	25%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80) 8) (C	286	206	51.3	18%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	С	61	16	17.8	29%	30%	1.8	6.0	ОК	
2	DESI	_	63	0	0) (C	126	63	38.3	30%	3078	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	С	50	25	28.7	57%	43%	3.7	5.0	ОК	
3	RASHADIA	16	40	40) () (C	96	56	34.4	36%	4070	0.0	5.0	ОК	
4	KARAK	63	63	25	5 0	(C	151	88	50.4	33%	26%	0.0	10.0	ОК	
4	KARAK SOUTH		80	0	-) (C	160	80	32.0	20%	2070	0.0	20.0	ОК	
5	SUBEIHI	-	63	63	3 0	(C	189	126	135.5	72%		9.5	6.0	No	
5	SWEIMEH		80	80	0 0) (C	240	160	87.3	36%	51%	0.0	3.0	ОК	
5	ISHTAFINA	-	45		3 0	(C	148	85	75.3	51%	0170	0.0	3.0	ОК	
5	WAQAS	_	63	_	3 0) (C	189	126	94.4	50%		0.0	3.0	ОК	
4	QATRANA	63	10	16	6 0	(C	89	26	21.9	25%	-	0.0	10.0	ОК	
99	GHORSAFI	-	40	40	+	-	-	200	160	67.0	34%	34%	0.0	0.0	ОК	
99	MAAN	-	16	16	6	3 6	3	174	111	56.1	32%	32%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	_	C	50	25	18.0	36%	36%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	(C	20	10	6.8	34%	34%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	_	С	20	10	4.8	24%	24%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0) (C	25	12.5	4.2	17%	17%	0.0	0.0	ОК	
										Avera	ge	32%				

ii) After countermeasures

								Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	Analysis
BSP Brouping	BSP (Substation)		No	o. of '	TR's			Capacity	Nº I Capacity	Peak Deman	d 2018	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	()							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	AQ A2	40	40	63	6	3	0	206	143	77.4	38%		0.0	25.0	OK	
1	AQ IND	80	80	0	0		0	160	80	35.2	22%	25%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80		0	286	206	51.3	18%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0		0	61	16	17.8	29%	30%	1.8	6.0	OK	
2	DESI	63	63	0	0		0	126	63	38.3	30%	30%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0		0	50	25	28.7	57%		3.7	5.0	OK	
3	Tafila	80	80					160	80		0%	21%	0.0	24.0	ОК	NEPCO Committed Project
3	RASHADIA		40	40	0 0		0	96	56	34.4	36%		0.0	5.0	OK	
4	KARAK	63	63	25	5 0	1	0	151	88	50.4	33%	26%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0		0	160	80	32.0	20%	2078	0.0	20.0	OK	
5	SUBEIHI	80	80	63	0		0	223	143	135.5	61%		0.0	6.0	ОК	34MVA
5	SWEIMEH	80	80	80	0 0		0	240	160	87.3	36%	49%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	3 0	Ŀ	0	148	85	75.3	51%	4370	0.0	3.0	OK	
5	WAQAS	63	63	63	0		0	189	126	94.4	50%		0.0	3.0	OK	
4	QATRANA	63	10	16	5 O		0	89	26	21.9	25%	-	0.0	10.0	OK	
99	GHORSAFI	40	40	40) 4() 4	10	200	160	67.0	34%	34%	0.0	0.0	OK	
99	MAAN	16	16	16	6	3 6	63	174	111	56.1	32%	32%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0		0	50	25	18.0	36%	36%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0		0	20	10	6.8	34%	34%	0.0	0.0	OK]
99	RWESHID	10	10	0	0		0	20	10	4.8	24%	24%	0.0	0.0	OK]
99	RESHA	12.5	12.5	0	0		0	25	12.5	4.2	17%	17%	0.0	0.0	OK	
										Avera	je	30%				

Table 14BSP Analysis by the NEPCO Practice for EDCO in 2019

1	BSP (Substation)		No	of T			Installed		Nonn	al State Ana	aiysis		00	ontingency State A	naiysis
1 / 1 /	· · ·			. 01 1	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2019	Group	Load Transfer MVA	Possible Load	N-1 Observation	
1	AQ A2						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
		40	40	63	63	0	206	143	81.5	40%		0.0	25.0	ОК	
1 4	AQ IND	80	80	0	0	0	160	80	37.1	23%	26%	0.0	15.0	ОК	
	AQTH & NEW	63	63	80	80	0	286	206	54.1	19%		0.0	10.0	ОК	
2 0	QUWEIRA	16	45	0	0	0	61	16	18.7	31%	32%	2.7	6.0	OK	
2 [DESI	63	63	0	0	0	126	63	40.4	32%	5270	0.0	6.0	OK	
3 E	EL_HASA	25	25	0	0	0	50	25	30.3	61%		5.3	5.0	No	
3 1	Tafila	80	80	0	0	0	160	80	0.0	0%	22%	0.0	24.0	ОК	
3 F	RASHADIA	16	40	40	0	0	96	56	36.2	38%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	53.1	35%	27%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	33.7	21%	21 %	0.0	20.0	ОК	
5	SUBEIHI	80	80	63	0	0	223	143	142.7	64%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	91.9	38%	52%	0.0	3.0	ОК	
5 I	ISHTAFINA	40	45	63	0	0	148	85	79.3	54%	5270	0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	99.4	53%		0.0	3.0	ОК	
4 0	QATRANA	63	10	16	0	0	89	26	23.1	26%	-	0.0	10.0	ОК	
99 0	GHORSAFI	40	40	40	40	40	200	160	70.6	35%	35%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	59.1	34%	34%	0.0	0.0	OK	
99 🖌	AZRAQ	25	25	0	0	0	50	25	19.0	38%	38%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0	20	10	7.2	36%	36%	0.0	0.0	ОК	
99 F	RWESHID	10	10	0	0	0	20	10	5.0	25%	25%	0.0	0.0	ОК	
99 F	RESHA	12.5	12.5	0	0	0	25	12.5	4.4	18%	18%	0.0	0.0	ОК	

ii) After countermeasures

							In	stalled	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Grouping	BSP (Substation)		No	. of 1	ſR's		Ca	apacity	N-1 Capacity	Peak Deman	id 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansfer between bors
1	AQ A2	40	40	63	63	0		206	143	81.5	40%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0		160	80	37.1	23%	26%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80	0		286	206	54.1	19%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0		61	16	18.7	31%	32%	2.7	6.0	ОК	
2	DESI	63	63	0	0	0		126	63	40.4	32%	3276	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0		50	25	15.3	31%		0.0	5.0	OK	
3	Tafila	80	80	0	0	0		160	80	15.0	9%	22%	0.0	24.0	OK	
3	RASHADIA	16	40	40	0	0		96	56	36.2	38%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0		151	88	53.1	35%	27%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0		160	80	33.7	21%	21 %	0.0	20.0	ОК	
5	SUBEIHI	80	80	63	0	0		223	143	142.7	64%		0.0	6.0	OK	
5	SWEIMEH	80	80	80	0	0		240	160	91.9	38%	52%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	0	0		148	85	79.3	54%	JZ /0	0.0	3.0	OK	
5	WAQAS	63	63	63	0	0		189	126	99.4	53%		0.0	3.0	OK	
4	QATRANA	63	10	16	0	0		89	26	23.1	26%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40		200	160	70.6	35%	35%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63		174	111	59.1	34%	34%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0		50	25	19.0	38%	38%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0		20	10	7.2	36%	36%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0		20	10	5.0	25%	25%	0.0	0.0	OK	
99	RESHA	12.5	12.5	0	0	0		25	12.5	4.4	18%	18%	0.0	0.0	ОК	
										Avera	ge	31%				

Table 15BSP Analysis by the NEPCO Practice for EDCO in 2020

							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Grouping	BSP (Substation)		No	of T	R's		Capacity	N-1 Capacity	Peak Demar	nd 2020	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	85.9	42%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	39.0	24%	28%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	57.0	20%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	19.7	32%	33%	3.7	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	42.5	34%	33%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	16.1	32%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	15.8	10%	23%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	38.1	40%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	55.9	37%	29%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	35.5	22%	29%	0.0	20.0	ОК	
5	SUBEIHI	80	80	63	0	0	223	143	150.3	67%		7.3	6.0	No	
5	SWEIMEH	80	80	80	0	0	240	160	96.9	40%	54%	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	83.5	56%	54%	0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	104.8	55%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0	89	26	24.3	27%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	74.4	37%	37%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	62.2	36%	36%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	20.0	40%	40%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	7.6	38%	38%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	5.3	27%	27%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.7	19%	19%	0.0	0.0	ОК	

ii) After countermeasures

							Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State A	Inalysis
BSP Grouping	BSP (Substation)		No	. of T	'R's		Capacity	Nº I Capacity	Peak Deman	id 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Edad fransfer between Bars
1	AQ A2	40	40	63	63	0	206	143	85.9	42%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	39.0	24%	28%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	57.0	20%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	61	16	19.7	32%	33%	3.7	6.0	OK	
2	DESI	63	63	0	0	0	126	63	42.5	34%	33%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	16.1	32%		0.0	5.0	OK	
3	Tafila	80	80	0	0	0	160	80	15.8	10%	37%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	38.1	40%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	55.9	37%	29%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	35.5	22%	2976	0.0	20.0	OK	
5	SUBEIHI	80	80	80	0	0	240	160	150.3	63%		0.0	6.0	ОК	17MVA
5	SWEIMEH	80	80	80	0	0	240	160	96.9	40%	53%	0.0	3.0	OK	
5	ISHTAFINA	40	45	63	0	0	148	85	83.5	56%	5578	0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	104.8	55%		0.0	3.0	OK	
4	QATRANA	63	10	16	0	0	89	26	24.3	27%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	74.4	37%	37%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	62.2	36%	36%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	20.0	40%	40%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0	20	10	7.6	38%	38%	0.0	0.0	OK	
99	RWESHID	10	10	0	0	0	20	10	5.3	27%	27%	0.0	0.0	OK	
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.7	19%	19%	0.0	0.0	OK	
									Avera	ge	34%				

Table 16BSP Analysis by the NEPCO Practice for EDCO in 2021

							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of T	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2021	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(Oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	90.5	44%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	41.1	26%	29%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	60.0	21%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	20.8	34%	35%	4.8	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	44.8	36%	35%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	16.9	34%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	16.6	10%	24%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	40.2	42%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	58.9	39%		0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	37.4	23%	30%	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	0	240	160	158.3	66%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	102.0	43%	500/	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	88.0	59%	56%	3.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	110.4	58%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0	89	26	25.6	29%	-	0.0	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	78.4	39%	39%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	65.6	38%	38%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	21.1	42%	42%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.0	40%	40%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	5.6	28%	28%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	4.9	20%	20%	0.0	0.0	ОК	
					•				Avera	ae	35%				

ii) After countermeasures

									Installed	N-1 Capacity	Norm	al State Ana	alysis		Ca	ntingency State A	nalysis
BSP Grouping	BSP (Substation)		ľ	No.	of T	'R's			Capacity	м-т Сараску	Peak Demar	nd 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
									[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load fransfer between Bors
1	AQ A2	40	4	0	63	63	0)	206	143	90.5	44%		0.0	25.0	OK	
1	AQ IND	80	8	0	0	0	0)	160	80	41.1	26%	29%	0.0	15.0	OK	
1	AQTH & NEW	63	6	3	80	80	0)	286	206	60.0	21%		0.0	10.0	OK	
2	QUWEIRA	16	4	5	0	0	0		61	16	20.8	34%	35%	4.8	6.0	OK	
2	DESI	63	6	3	0	0	0)	126	63	44.8	36%	33%	0.0	6.0	OK	
3	EL_HASA	25	2	5	0	0	0)	50	25	16.9	34%		0.0	5.0	OK	
3	Tafila	80	8	0	0	0	0)	160	80	16.6	10%	24%	0.0	24.0	OK	
3	RASHADIA	16	4	0	40	0	0)	96	56	40.2	42%		0.0	5.0	OK	
4	KARAK	63	6	3	25	0	0)	151	88	58.9	39%	30%	0.0	10.0	OK	
4	KARAK SOUTH		8		0	0	0	1	160	80	37.4	23%	30%	0.0	20.0	OK	
5	SUBEIHI	80	8	0	80	0	0		240	160	158.3	66%		0.0	6.0	OK	
5	SWEIMEH	80	8	0	80	0	C		240	160	102.0	43%	56%	0.0	3.0	ОК	
5	ISHTAFINA	40	4	5	63	0	C		148	85	88.0	59%	5078	3.0	3.0	OK	
5	WAQAS	63	6	3	63	0	0	1	189	126	110.4	58%		0.0	3.0	OK	
4	QATRANA	63	1	0	16	0	0		89	26	25.6	29%	-	0.0	10.0	ОК	
99	GHORSAFI	40	4	0	40	40	4	C	200	160	78.4	39%	39%	0.0	0.0	OK	
99	MAAN	16	i 1	6	16	63	6	3	174	111	65.6	38%	38%	0.0	0.0	OK	
99	AZRAQ	25	2	5	0	0	0		50	25	21.1	42%	42%	0.0	0.0	OK	
99	SAFAWI	10	1	0	0	0	0	1	20	10	8.0	40%	40%	0.0	0.0	ОК	
99	RWESHID	10	1	0	0	0	0		20	10	5.6	28%	28%	0.0	0.0	OK	
99	RESHA	12.1	12	5	0	0	0		25	12.5	4.9	20%	20%	0.0	0.0	OK	
											Avera	ge	35%				

Table 17	BSP Analysis by the NEPCO Practice for EDCO in 2022

							Installed		Norm	al State Ana	alysis		Co	ntingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of T	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2022	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	95.3	46%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	43.3	27%	31%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	63.2	22%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	61	16	21.9	36%	37%	5.9	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	47.2	37%	31%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	17.8	36%		0.0	5.0	OK	
3	Tafila	80	80	0	0	0	160	80	17.5	11%	25%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	42.3	44%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	62.0	41%	32%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	39.4	25%	32%	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	0	240	160	166.8	69%		6.8	6.0	No	
5	SWEIMEH	80	80	80	0	0	240	160	107.5	45%	500/	0.0	3.0	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	92.7	63%	59%	7.7	3.0	No	
5	WAQAS	63	63	63	0	0	189	126	116.2	62%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0	89	26	27.0	30%	-	1.0	10.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	82.6	41%	41%	0.0	0.0	OK	
99	MAAN	16	16	16	63	63	174	111	69.1	40%	40%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	22.2	44%	44%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.4	42%	42%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	5.9	30%	30%	0.0	0.0	OK	
99	RESHA	12.5	12.5	0	0	0	25	12.5	5.2	21%	21%	0.0	0.0	ОК	
									Avera	ae	37%				

ii) After countermeasures

							Installed	N-1 Capacity	Norm	al State Ana	alysis		Co	ontingency State A	Analysis
BSP Grouping	BSP (Substation)		No.	of TF	R's		Capacity	Nº1 Capacity	Peak Demar	nd 2022	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
pg							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	AQ A2	40	40	63	63	0	206	143	95.3	46%		0.0	25.0	OK	
1	AQ IND	80	30	0	0	0	160	80	43.3	27%	31%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80	0	286	206	63.2	22%		0.0	10.0	OK	
2	QUWEIRA	16	45	0	0	0	61	16	21.9	36%	37%	5.9	6.0	OK	
2	DESI	63	63	0	0	0	126	63	47.2	37%	31 %	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	17.8	36%		0.0	5.0	OK	
3	Tafila	80	30	0	0	0	160	80	17.5	11%	25%	0.0	24.0	OK]
3	RASHADIA	16	40	40	0	0	96	56	42.3	44%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	62.0	41%	32%	0.0	10.0	OK	
4	KARAK SOUTH	80	30	0	0	0	160	80	39.4	25%	52 /6	0.0	20.0	OK	
5	SUBEIHI	80	30	80	0	0	240	160	136.8	57%		0.0	6.0	OK	
5	SWEIMEH	80	30	80	0	0	240	160	107.5	45%		0.0	3.0	OK	
5	New BSP	63	63				126	63	60.0	48%	51%	0.0	9.5	OK	BSP study at Group 5
5	ISHTAFINA	40	45	63	0	0	148	85	72.7	49%		0.0	3.0	OK	
5	WAQAS	63	63	63	0	0	189	126	106.2	56%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0	89	26	27.0	30%	-	1.0	10.0	OK	
99	GHORSAFI	40	40	40	40	40	200	160	82.6	41%	41%	0.0	0.0	OK]
99	MAAN	16	16	16	63	63	174	111	69.1	40%	40%	0.0	0.0	OK	
99	AZRAQ	25	25	0	0	0	50	25	22.2	44%	44%	0.0	0.0	OK	
99	SAFAWI	10	10	0	0	0	20	10	8.4	42%	42%	0.0	0.0	OK	
99	RWESHID	10	10	0	0	0	20	10	5.9	30%	30%	0.0	0.0	OK	
99	RESHA	12.5 1	2.5	0	0	0	25	12.5	5.2	21%	21%	0.0	0.0	OK	
									Avera	ge	36%				

Table 18	BSP Analysis by the NEPCO Practice for EDCO in 2023

							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of 1	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2023	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(Substation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	100.4	49%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	45.6	29%	33%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	66.6	23%		0.0	10.0	ОК	
2	QUWEIRA	16	45	0	0	0	61	16	23.1	38%	39%	7.1	6.0	No	
2	DESI	63	63	0	0	0	126	63	49.7	39%	39%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	18.8	38%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	18.5	12%	27%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	44.6	46%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	0	151	88	65.4	43%	34%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	41.5	26%	34%	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	0	240	160	144.1	60%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	113.2	47%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	0	126	63	63.2	50%	54%	0.2	9.5	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	76.5	52%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	111.9	59%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0	89	26	28.4	32%	-	2.4	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	87.0	43%	43%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	72.8	42%	42%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	23.4	47%	47%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	44%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	6.2	31%	31%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	5.5	22%	22%	0.0	0.0	ОК	

ii) After countermeasures	
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	505						Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ontingency State /	Analysis
BSP Grouping	BSP (Substation)		No	. of 1	R's		Capacity	Nº1 Capacity	Peak Deman	id 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansfer between bors
1	AQ A2	40	40	63	63	0	206	143	100.4	49%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	0	160	80	45.6	29%	33%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80	0	286	206	66.6	23%		0.0	10.0	ОК	
2	QUWEIRA	63	45	0	0	0	108	45	23.1	21%	31%	0.0	6.0	OK	47MVA
2	DESI	63	63	0	0	0	126	63	49.7	39%	51%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25	18.8	38%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	18.5	12%	27%	0.0	24.0	OK	
3	RASHADIA	16	40	40	0	0	96	56	44.6	46%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	65.4	43%	34%	0.0	10.0	OK	
4	KARAK SOUTH	80	80	0	0	0	160	80	41.5	26%	5478	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	0	240	160	144.1	60%		0.0	6.0	OK	
5	SWEIMEH	80		80	0	0	240	160	113.2	47%		0.0	3.0	OK	
5	New BSP	63	63	0	0	0	126	63	63.2	50%	54%	0.2	9.5	OK	
5	ISHTAFINA	40	_	63	0	0	148	85	76.5	52%		0.0	3.0	OK	
5	WAQAS	63	_	63	0	0	189	126	111.9	59%		0.0	3.0	OK	
4	QATRANA	63		16	0	0	89	26	28.4	32%	-	2.4	10.0	ОК	ļ
99	GHORSAFI	40		40	40	40	200	160	87.0	43%	43%	0.0	0.0	OK	ļ
99	MAAN	16		16	63	+		111	72.8	42%	42%	0.0	0.0	ОК	1
99	AZRAQ		25	0	0	0		25	23.4	47%	47%	0.0	0.0	OK	ļ
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	44%	0.0	0.0	OK	ļ
99	RWESHID	10		0	0	0	20	10	6.2	31%	31%	0.0	0.0	OK	ļ
99	RESHA	12.5	12.5	0	0	0	25	12.5	5.5	22%	22%	0.0	0.0	OK	
									Avera	ge	37%				

BSP Oruging (Substation) No. of TR*- (Substation) No. of TR*- (Substation) No. of TR*- (Tansfer MA) No. of TR*- (Tansfer MA) No. of TR*- (NA) No. of TR*-								Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
Image: Control Image: Control Image: Control Image: Control Image: Control Transfer MAA Check Control Contro Control Control <th></th> <th></th> <th></th> <th>No</th> <th>. of 1</th> <th>'R's</th> <th></th> <th>Capacity</th> <th>N-1 Capacity</th> <th>Peak Demar</th> <th>nd 2024</th> <th></th> <th></th> <th>Possible Load</th> <th>N-1 Observation</th> <th></th>				No	. of 1	'R's		Capacity	N-1 Capacity	Peak Demar	nd 2024			Possible Load	N-1 Observation	
AQ IND 80 80 0 0 100 100 100 100 100 100 100 100 100 1 AQTH & NEW 63 63 80 0 0 108 45 243 23% 0.0 10.0 0K 2 QUWEIRA 63 45 0 0 126 63 52.3 42% 33% 0.0 6.0 0K 2 DESI 63 63 0 0 126 63 52.3 42% 33% 0.0 6.0 0K 3 Tafila 80 0 0 50 25 19.8 40% 28% 0.0 6.0 0K 3 Tafila 80 0 0 160 80 19.5 12% 0.0 5.0 0K 4 KARAK 63 63 25 0 0 1160 111.8 63% 0.0 0.0	Jouping	(Substation)						[MVA]	[MVA]	[MVA]	%			Transfer MVA	Check	Load Transfer between BSPs
I AQTH & NEW 63 63 80 90 2 2000 70.1 25% 0.0 10.0 OK 2 QUWEIRA 63 45 0 0 0 108 45 24.3 23% 33% 0.0 6.0 OK 2 DESI 63 63 0 0 126 63 52.3 42% 0.0 6.0 OK 3 ELHASA 25 25 0 0 50 255 19.8 40% 0.0 6.0 OK 3 RASHADIA 16 40 0 90 56 47.0 49% 0.0 5.0 OK 4 KARAK 63 63 0 0 151 88 68.8 46% 46% 0.0 0.0 0.0 4 KARAK 63 63 0 0 126 63 63% 56% 50% 50% 56%	1	AQ A2	40	40	63	63	0	206	143	105.7	51%		0.0	25.0	ОК	
2 QUWEIRA 63 45 0 0 108 45 24.3 23% 33% 0.0 6.0 OK 2 DESI 63 63 0 0 126 63 52.3 42% 33% 0.0 6.0 OK 3 EL,HASA 25 25 0 0 50 25 19.8 40% 0.0 6.0 OK 3 Tafila 80 80 0 0 160 80 19.5 12% 28% 0.0 5.0 OK 3 RASHADIA 16 40 0 0 96 56 47.0 49% 0.0 5.0 OK 4 KARAK 63 62 0 0 1160 80 43.8 27% 0.0 10.0 OK 5 SUBEINI 80 80 0 0 126 63 63% 65% 0.0 0.0	1	AQ IND	80	80	0	0	0	160	80	48.1	30%	34%	0.0	15.0	ОК	
2 DESI 63 63 0 0 126 63 52.3 42% 33% 0.0 6.0 OK 3 EL,HASA 25 25 0 0 0 50 25 19.8 40% 3 Tafila 80 0 0 0 160 80 19.5 12% 28% 0.0 5.0 OK 3 RASHADIA 16 40 0 0 96 56 47.0 49% 0.0 0.0 0.0 OK 4 KARAK 63 63 63 0 151 88 68.8 46% 0.0 0.0 0.0 OK 4 KARAK SOUTH 80 80 0 151 880 151.8 63% 0.0 0.0 CK 5 SUBEIHI 80 80 0 1240 160 111.3 50% 0.0 3.0 OK 5	1	AQTH & NEW	63	63	80	80	0	286	206	70.1	25%		0.0	10.0	ОК	
2 DESI 63 63 0 0 126 63 52.3 42% M 0.0 6.0 OK 3 EL_HASA 26 0 0 0 50 25 19.8 40% 28% 0.0 6.0 OK 3 Tafila 80 80 0 0 50 25.6 19.8 40% 0.0 6.0 OK 3 Tafila 80 80 0 0 96 56.6 47.0 49% 0.0 5.0 OK 4 KARAK 63 63 25 0 0 151 88 68.8 46% 0.0 0.0 0.0K 4 KARAK SOUTH 80 80 0 0 240 160 151.8 63% 0.0 0.0K 0K 5 SWEIMEH 80 80 0 0 244 160 111.3 50% 0.0 0.0	2	QUWEIRA	63	45	0	0	0	108	45	24.3	23%	220/	0.0	6.0	OK	
3 Tafila 80 80 0 0 160 80 19.5 12% 28% 0.0 24.0 OK 3 RASHADIA 16 40 0 0 96 56 47.0 49% 0.0 5.0 OK 4 KARAK 63 63 25 0 0 151 88 68.8 46% 0.0 5.0 OK 4 KARAK SOUTH 80 80 0 0 151 88 68.8 46% 0.0 10.0 OK 5 SUBEIHI 80 80 0 0 240 160 151.8 63% 0.0 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 119.3 50% 0.0 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 119.3 50% 3.6 9.5 OK 5 ISHTAFINA 40 40 40 0	2	DESI	63	63	0	0	0	126	63	52.3	42%	33%	0.0	6.0	ОК	
3 RASHADIA 16 40 0 9 56 47.0 49% 0.0 5.0 OK 4 KARAK 63 63 25 0 0 151 88 68.8 46% 36% 0.0 10.0 OK 4 KARAK SOUTH 80 80 0 0 160 80 43.8 27% 36% 0.0 20.0 OK 5 SUBEIHI 80 80 0 0 240 1600 111.8 63% 36% 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 111.3 50% 30.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 111.3 50% 5 ISHTAFINA 43 63 63 63 63 63 63 63 63 63 63 126 1	3	EL_HASA	25	25	0	0	0	50	25	19.8	40%		0.0	5.0	OK	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	3	Tafila	80	80	0	0	0	160	80	19.5	12%	28%	0.0	24.0	ОК	
4 KARAK SOUTH 80 80 0 0 160 80 43.8 27% 36% 0.0 20.0 OK 5 SUBEIHI 80 80 0 0 240 160 151.8 63% 0.0 0.0 0.0 OK 5 SWEIMEH 80 80 0 0 240 160 119.3 50% 0.0 0.0 0.0 0.0 5 SWEIMEH 80 80 0 0 1240 160 119.3 50% 0.0 0.0 0.0 0.0 5 New BSP 63 63 0 0 126 63 66.6 54% 0.0 3.0 OK 5 WAQAS 63 63 0 0 148 85 80.6 54% 0.0 3.0 OK 4 QATRANA 63 10 6 899 266 29.9 34% - 3.9 10.0 OK 99 GHORSAFI 40 40 40 20	3	RASHADIA	16	40	40	0	0	96	56	47.0	49%		0.0	5.0	ОК	
4 KARAK SOUTH 80 80 0 0 0 0 160 43.8 27% 0 0.0 20.0 OK 5 SUBEIHI 80 80 0 0 0 240 160 151.8 63% 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 119.3 50% 0.0 0.0 0.0 0K 5 SWEIMEH 80 80 0 0 240 160 119.3 50% 0.0 0.0 0K 5 New BSP 63 63 0 0 126 63 66.6 53% 0.0 0.0 0K 5 ISHTAFINA 40 45 0 0 148 85 80.6 54% 0.0 0.0 0K 5 ISHTAFINA 63 10 16 0 89 260 29.9 34% - 3.9 10.0 0K 99 GHORSAFI 40 40 40	4	KARAK	63	63	25	0	0	151	88	68.8	46%	200/	0.0	10.0	ОК	
SWEIMEH 80 80 80 80 90 240 160 119.3 50% 5 New BSP 63 63 0 0 126 63 666 53% 5 ISHTAFINA 40 45 63 0 126 63 666 53% 5 ISHTAFINA 40 45 63 0 148 85 80.6 54% 5 WAQAS 63 63 0 189 126 117.9 62% 0.0 3.0 OK 4 QATRANA 63 10 0 0 899 26 29.9 34% - 3.9 10.0 OK 99 GHORSAFI 40 40 40 200 160 91.6 46% 46% 0.0 0.0 OK 99 MAN 16 16 63 174 111 76.6 44% 44% 0.0 0.0 <	4	KARAK SOUTH	80	80	0	0	0	160	80	43.8	27%	30%	0.0	20.0	ОК	
New BSP 63 63 64 0 0 126 63 66.6 53% 5 ISHTAFINA 40 45 63 0 0 148 85 80.6 54% 0.0 3.0 OK 5 WAQAS 63 63 63 0 0 189 126 117.9 62% 0.0 3.0 OK 4 QATRANA 63 10 16 0 89 26 29.9 34% - 3.9 10.0 OK 99 GHORSAFI 40 40 40 40 200 160 91.6 46% 46% 0.0 0.0 OK 99 MAAN 16 16 63 174 111 76.6 44% 44% 0.0 0.00 OK 99 AZRAQ 25 25 0 0 200 110 9.3 47% 0.0 0.00 OK <	5	SUBEIHI	80	80	80	0	0	240	160	151.8	63%		0.0	6.0	ОК	
5 ISHTAFINA 40 45 63 0 0 148 85 80.6 54% 0.0 3.0 OK 5 WAQAS 63 63 63 63 0 0 189 126 117.9 62% 0.0 3.0 OK 4 QATRANA 63 10 16 0 899 26 29.9 34% - 3.9 10.0 OK 99 GHORSAFI 40 40 40 200 160 91.6 46% 46% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 76.6 44% 40% 0.0 0.0 OK 99 AZRAQ 25 25 0 50 25 24.6 49% 40% 0.0 0.0 OK 99 AZRAQ 25 25 0 50 25 24.6 49% 40% </td <td>5</td> <td>SWEIMEH</td> <td>80</td> <td>80</td> <td>80</td> <td>0</td> <td>0</td> <td>240</td> <td>160</td> <td>119.3</td> <td>50%</td> <td></td> <td>0.0</td> <td>3.0</td> <td>ОК</td> <td></td>	5	SWEIMEH	80	80	80	0	0	240	160	119.3	50%		0.0	3.0	ОК	
5 WAQAS 63 64 6	5	New BSP	63	63	0	0	0	126	63	66.6	53%	57%	3.6	9.5	ОК	
4 QATRANA 63 10 16 0 899 26 29.9 34% - 3.9 10.0 OK 99 GHORSAFI 40 40 40 200 160 91.6 46% 46% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 76.6 44% 44% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 50 25 24.6 49% 49% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 20 10 9.3 47% 47% 0.0 0.0 OK 99 RWESHID 10 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	5	ISHTAFINA	40	45	63	0	0	148	85	80.6	54%		0.0	3.0	ОК	
99 GHORSAFI 40 40 40 40 200 160 91.6 46% 46% 0.0 0.0 OK 99 MAAN 16 16 63 63 174 111 76.6 44% 44% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 550 25 24.6 49% 49% 0.0 0.0 OK 99 SAFAWI 10 0 0 20 10 9.3 47% 47% 0.0 0.0 OK 99 RWESHID 10 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	5	WAQAS	63	63	63	0	0	189	126	117.9	62%		0.0	3.0	OK	
99 MAAN 16 16 63 63 174 111 76.6 44% 44% 0.0 0.0 OK 99 AZRAQ 25 25 0 0 50 25 24.6 49% 49% 0.0 0.0 OK 99 SAFAWI 10 0 0 20 10 9.3 47% 47% 0.0 0.0 OK 99 RWESHID 10 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	4	QATRANA	63	10	16	0	0	89	26	29.9	34%	-	3.9	10.0	ОК	
99 AZRAQ 25 25 0 0 0 500 25 24.6 49% 49% 0.0 0.0 OK 99 SAFAWI 10 10 0 0 20 10 9.3 47% 47% 0.0 0.0 OK 99 RWESHID 10 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	99	GHORSAFI	40	40	40	40	40	200	160	91.6	46%	46%	0.0	0.0	ОК	
99 SAFAWI 10 10 0 0 20 10 9.3 47% 47% 0.0 0.0 OK 99 RWESHID 10 0 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	99	MAAN	16	16	16	63	63	3 174	111	76.6	44%	44%	0.0	0.0	ОК	
99 RWESHID 10 10 0 0 0 20 10 6.5 33% 33% 0.0 0.0 OK	99	AZRAQ	25	25	0	0	0	50	25	24.6	49%	49%	0.0	0.0	OK	
	99	SAFAWI	10	10	0	0	0	20	10	9.3	47%	47%	0.0	0.0	ОК	
99 RESHA 125 125 0 0 0 25 12.5 5.8 23% 23% 0.0 0.0 OK	99	RWESHID	10	10	0	0	0	20	10	6.5	33%	33%	0.0	0.0	ОК	
	99	RESHA	12.5	12.5	0	0	0	25	12.5	5.8	23%	23%	0.0	0.0	OK	

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								Installed	N-1 Capacity	Norma	al State Ana	alysis		Co	ntingency State A	nalysis
BSP Grouping	BSP (Substation)		No	o. of ⊺	ſR's			Capacity	N-1 Capacity	Peak Deman	d 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load fransfer between Bars
1	AQ A2	40	40	63	63	5 ()	206	143	105.7	51%		0.0	25.0	OK	
1	AQ IND	80	80	0	0	()	160	80	48.1	30%	34%	0.0	15.0	OK	
1	AQTH & NEW	63	63	80	80)	286	206	70.1	25%		0.0	10.0	ОК	
2	QUWEIRA	63	45	0	0	()	108	45	24.3	23%	33%	0.0	6.0	ОК	
2	DESI	63	63	0	0	()	126	63	52.3	42%	3378	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0)	50	25	19.8	40%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0)	160	80	19.5	12%	28%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	()	96	56	47.0	49%		0.0	5.0	ОК	
4	KARAK	63	63	25	0	()	151	88	68.8	46%	36%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0)	160	80	43.8	27%	5078	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	()	240	160	151.8	63%		0.0	6.0	ОК	
5	SWEIMEH	80			0	()	240	160	119.3	50%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	()	126	63	66.6	53%	57%	3.6	9.5	ОК	
5	ISHTAFINA	40	45		-	0)	148	85	80.6	54%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	()	189	126	117.9	62%		0.0	3.0	ОК	
4	QATRANA	63	10	16	0	0)	89	26	29.9	34%	-	3.9	10.0	ОК	
99	GHORSAFI	40	-	40	40	4	0	200	160	91.6	46%	46%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	6	3	174	111	76.6	44%	44%	0.0	0.0	ОК	
99	AZRAQ	-	25	0	0	0)	50	25	24.6	49%	49%	0.0	0.0	ОК	
99	SAFAWI	10	10	0	0	0	C	20	10	9.3	47%	47%	0.0	0.0	ОК	
99	RWESHID	10		0	0	0)	20	10	6.5	33%	33%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0)	25	12.5	5.8	23%	23%	0.0	0.0	ОК	
		_								Avera	ge	39%				

	Tab	le 20 BSP A	nalysis by the NEPC	CO Practice for EDCO in 2025
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							Installed		Norm	al State Ana	alysis		Co	ontingency State A	nalysis
BSP Brouping	BSP (Substation)		No	. of 1	ſR's		Capacity	N-1 Capacity	Peak Dema	nd 2025	Group	Load Transfer MVA	Possible Load	N-1 Observation	
Jouping	(oubstation)						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	AQ A2	40	40	63	63	0	206	143	111.4	54%		0.0	25.0	ОК	
1	AQ IND	80	80	0	0	0	160	80	50.6	32%	36%	0.0	15.0	ОК	
1	AQTH & NEW	63	63	80	80	0	286	206	73.9	26%		0.0	10.0	OK	
2	QUWEIRA	63	45	0	0	0	108	45	25.6	24%	35%	0.0	6.0	ОК	
2	DESI	63	63	0	0	0	126	63	55.1	44%	33%	0.0	6.0	ОК	
3	EL_HASA	25	25	0	0	0	50	25	20.9	42%		0.0	5.0	ОК	
3	Tafila	80	80	0	0	0	160	80	20.5	13%	30%	0.0	24.0	ОК	
3	RASHADIA	16	40	40	0	0	96	56	49.5	52%		0.0	5.0	OK	
4	KARAK	63	63	25	0	0	151	88	72.5	48%	38%	0.0	10.0	ОК	
4	KARAK SOUTH	80	80	0	0	0	160	80	46.1	29%	36%	0.0	20.0	ОК	
5	SUBEIHI	80	80	80	0	0	240	160	159.9	67%		0.0	6.0	ОК	
5	SWEIMEH	80	80	80	0	0	240	160	125.6	52%		0.0	3.0	ОК	
5	New BSP	63	63	0	0	0	126	63	70.1	56%	60%	7.1	9.5	ОК	
5	ISHTAFINA	40	45	63	0	0	148	85	84.9	57%		0.0	3.0	ОК	
5	WAQAS	63	63	63	0	0	189	126	124.2	66%		0.0	3.0	OK	
4	QATRANA	63	10	16	0	0	89	26	31.5	35%	-	5.5	10.0	ОК	
99	GHORSAFI	40	40	40	40	40	200	160	96.5	48%	48%	0.0	0.0	ОК	
99	MAAN	16	16	16	63	63	174	111	80.7	46%	46%	0.0	0.0	ОК	
99	AZRAQ	25	25	0	0	0	50	25	25.9	52%	52%	0.9	0.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	9.8	49%	49%	0.0	0.0	ОК	
99	RWESHID	10	10	0	0	0	20	10	6.9	34%	34%	0.0	0.0	ОК	
99	RESHA	12.5	12.5	0	0	0	25	12.5	6.1	24%	24%	0.0	0.0	ОК	
	•								Avera	ge	41%				

ii) A	fter	countermeasures
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							Install		situ	Norma	al State Ana	alysis		Co	ntingency State A	Inalysis
BSP Grouping	BSP (Substation)		No.	of T	R's		Capac	ty Net Capa	Sity	Peak Deman	d 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA	[MVA]		[MVA]	%	(%)	Observation	Transfer MVA	Check	Edau fransfer between bors
1	AQ A2	40 4	40	63	63	0	206	143		111.4	54%		0.0	25.0	OK	
1	AQ IND	80 8	30	0	0	0	160	80		50.6	32%	36%	0.0	15.0	OK	
1	AQTH & NEW	63 6	63	80	80	0	286	206		73.9	26%		0.0	10.0	OK	
2	QUWEIRA	63 4	45	0	0	0	108	45		25.6	24%	35%	0.0	6.0	OK	
2	DESI	63 6	63	0	0	0	126	63		55.1	44%	30%	0.0	6.0	OK	
3	EL_HASA	25	25	0	0	0	50	25		20.9	42%		0.0	5.0	ОК	
3	Tafila	80 8	30	0	0	0	160	80		20.5	13%	30%	0.0	24.0	OK	
3	RASHADIA	16 4	40	40	0	0	96	56		49.5	52%		0.0	5.0	ОК	
4	KARAK	63 (63	25	0	0	151	88		72.5	48%	38%	0.0	10.0	OK	
4	KARAK SOUTH	80 8	30	0	0	0	160	80		46.1	29%	30%	0.0	20.0	OK	
5	SUBEIHI	80 8	30	80	0	0	240	160		159.9	67%		0.0	6.0	OK	
5	SWEIMEH	80 8	30	80	0	0	240	160		125.6	52%		0.0	3.0	ОК	
5	New BSP	63 (63	0	0	0	126	63		70.1	56%	60%	7.1	9.5	OK	
5	ISHTAFINA	40 4	45	63	0	0	148	85		84.9	57%		0.0	3.0	ОК	
5	WAQAS	63 6	63	63	0	0	189	126		124.2	66%		0.0	3.0	ОК	
4	QATRANA	63 [·]	10	16	0	0	89	26		31.5	35%	-	5.5	10.0	OK	
99	GHORSAFI	40 4	40	40	40	40	200	160		96.5	48%	48%	0.0	0.0	ОК	
99	MAAN	16 [·]	16	16	63	63	174	111		80.7	46%	46%	0.0	0.0	ОК	
99	AZRAQ	25 2	25	63	0	0	113	50		25.9	23%	23%	0.0	0.0	ОК	Addition of 63MVA transformer
99	SAFAWI	10	10	0	0	0	20	10		9.8	49%	49%	0.0	0.0	ОК	
99	RWESHID	10 ·	10	0	0	0	20	10		6.9	34%	34%	0.0	0.0	ОК	
99	RESHA	12.5 1	2.5	0	0	0	25	12.5		6.1	24%	24%	0.0	0.0	ОК	
										Avera	ae	38%				•

(3) BSP Analysis for IDECO

Table 21 BSP Analysis by the NEPCO Practice for IDECO in 2016

i) No countermeasure

			Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency S	State Analysis
BSP	BSP	No. of TR's	Capacity	N-1 Capacity	Peak Deman			Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)		[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80 60 63	203	123	161.5	80%		38.5	57.6	ОК	
1	IRBID EAST	80 80	160	80	70.3	44%	56%	0.0	22.3	ОК	
1	HASAN IND	80 80	160	80	59.2	37%		0.0	24.6	ОК	
2	REHAB	40 40	80	40	72.7	91%		32.7	34.3	ОК	
2	MAFRAQ	80 80 80	240	160	57.9	24%	39%	0.0	48.2	ОК	
2	SABHA	40 40	80	40	29.6	37%		0.0	25.9	ОК	
2	DHULEIL	80 80	160	80	56.7	35%		0.0	15.5	ОК	
99	WAQAS	63 63	126	63	85.1	68%	-	22.1	25.1	ОК	
99	ISHTAFINA	40 45	85	40	67.8	80%	-	27.8	14.0	No	
99	SAFAWI	10	10	0	6.2	62%	-	6.2	2.6	No	
					Avera	ge	47%				

						Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP	BSP		No	o. of Ti	R's	Capacity	Nº I Capacity	Peak Deman	d 2016		Load Transfer MVA	Possible Load	N-1 Observation	
Grouping	(Substation)					[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Necessary for N-1 Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	60	63		203	123	161.5	80%		38.5	57.6	ОК	
1	IRBID EAST	80	80			160	80	70.3	44%	56%	0.0	22.3	ОК	
1	HASAN IND	80	80			160	80	59.2	37%		0.0	24.6	ОК	
2	REHAB	40	40	80		160	80	72.7	45%		0.0	34.3	ОК	80MVA
2	MAFRAQ	80	80	80		240	160	57.9	24%	34%	0.0	48.2	ОК	
2	SABHA	40	40			80	40	29.6	37%	34%	0.0	25.9	ОК	
2	DHULEIL	80	80			160	80	56.7	35%		0.0	15.5	ОК	
99	WAQAS	63	63			126	63	85.1	68%	I	22.1	25.1	ОК	
99	ISHTAFINA	40	45	63		148	85	67.8	46%	-	0.0	14.0	ОК	NEPCO committed project
99	SAFAWI	10				10	0	6.2	62%	-	6.2	2.6	No	NEPCO Committed Project in 2017
						Avera	ge	45%						

							Installed	N-1 Capacity		al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of Th	₹'s		Capacity [MVA]	[MVA]	Peak Demar [MVA]	nd 2017 %	Group Operating rate (%)	Load Transfer MVA Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	IRBID	80	60	63	0	0	203	123	170.1	84%		47.1	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	74.0	46%	59%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	62.3	39%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	76.6	48%		0.0	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	61.0	25%	36%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	31.2	39%		0.0	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	59.7	37%		0.0	15.5	ОК	
99	WAQAS	63	63	0	0	0	126	63	89.6	71%	-	26.6	25.1	No	
99	ISHTAFINA	40	45	63	0	0	148	85	71.4	48%	-	0.0	14.0	ОК	
99	SAFAWI	10	0	0	0	0	10	0	6.5	65%	-	6.5	2.6	No	
									Avera	qe	47%				

Table 22BSP Analysis by the NEPCO Practice for IDECO in 2017

ii) After countermeasures

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		N	o. of T	R's		Capacity	м-т сарасну	Peak Demar	nd 2017	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	60	63	0	0	203	123	170.1	84%		47.1	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	74.0	46%	59%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	62.3	39%		0.0	24.6	ок	
2	REHAB	40	40	80	0	0	160	80	76.6	48%		0.0	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	61.0	25%	36%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	31.2	39%	30%	0.0	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	59.7	37%		0.0	15.5	ОК	
99	WAQAS	63	63	63			189	126	89.6	47%	-	0.0	25.1	ок	NEPCO Committed Project
99	ISHTAFINA	40	45	63			148	85	71.4	48%	-	0.0	14.0	ОК	
99	SAFAWI	10	10				20	10	6.5	32%	-	0.0	2.6	ОК	NEPCO Committed Project
									Avera	ge	47%				•

i) No co	puntermeasu	ure	_	_	_		Installed		Maarr	-I Ctata Are	- to - i -				
							Capacity	N-1 Capacity	Peak Demar	al State Ana d 2018	ŕ			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of T	R's		[MVA]	[MVA]	[MVA]	%	Group Operating rate (%)	Load Transfer MVA Necessary for N-1 Observation	Possible Load Transfer MVA	N-1 Observation Check	Load Transfer between BSPs
1	IRBID	80	60	63	0	0	203	123	179.2	88%		56.2	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	78.0	49%	62%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	65.7	41%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	80.7	50%		0.7	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	64.3	27%	38%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	32.8	41%		0.0	25.9	ок	
2	DHULEIL	80	80	0	0	0	160	80	62.9	39%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	94.4	50%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	75.3	51%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	6.8	34%	-	0.0	2.6	ОК	
									Avera	ge	50%				

Table 23BSP Analysis by the NEPCO Practice for IDECO in 2018

ii) After countermeasures

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of Ti	₹'s		Capacity	N-1 Capacity	Peak Deman	d 2018	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	IRBID	80	60	63	0	0	203	123	179.2	88%		56.2	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	78.0	49%	62%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	65.7	41%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	80.7	50%		0.7	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	64.3	27%	38%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	32.8	41%		0.0	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	62.9	39%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	94.4	50%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	75.3	51%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	6.8	34%	-	0.0	2.6	ОК	
									Avera	ge	50%				

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency S	State Analysis
BSP Grouping	BSP (Substation)		No	. of Ti	₹'s		Capacity	м-т Сараску	Peak Deman	nd 2019	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transier between BSFS
1	IRBID	80	60	63	0	0	203	123	188.8	93%		65.8	57.6	No	
1	IRBID EAST	80	80	0	0	0	160	80	82.2	51%	65%	2.2	22.3	ОК	
1	HASAN IND	80	40 40 80 0 0			0	160	80	69.2	43%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	85.0	53%		5.0	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	67.7	28%	40%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	34.6	43%		0.0	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	66.3	41%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	99.4	53%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	79.3	54%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	7.2	36%	-	0.0	2.6	ОК	
									Avera	qe	52%				

Table 24BSP Analysis by the NEPCO Practice for IDECO in 2019

,							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of T	R's		Capacity	м-т Сараску	Peak Deman		Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansier between bor s
1	IRBID	80	80	80	0	0	240	160	188.8	79%		28.8	57.6	ОК	37MVA
1	IRBID EAST	80	80	0	0	0	160	80	82.2	51%	61%	2.2	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	69.2	43%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	85.0	53%		5.0	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	67.7	28%	40%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	34.6	43%	40%	0.0	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	66.3	41%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	99.4	53%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	79.3	54%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	7.2	36%	-	0.0	2.6	ОК	
									Avera	ge	50%				

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency S	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	l's		Capacity	Nº I Capacity	Peak Deman	nd 2020	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transier between BSFS
1	IRBID	80	80	80	0	0	240	160	198.9	83%		38.9	57.6	ОК	
1	IRBID EAST	80	80 80 0 0 0			0	160	80	86.5	54%	64%	6.5	22.3	ОК	
1	HASAN IND	80	40 40 80 0 0		160	80	72.9	46%		0.0	24.6	ОК			
2	REHAB	40	40	80	0	0	160	80	89.6	56%		9.6	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	71.4	30%	42%	0.0	48.2	ОК	
3	SABHA	40	40	0	0	0	80	40	36.4	46%		0.0	25.9	ОК	
3	DHULEIL	80	80	0	0	0	160	80	69.8	44%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	104.8	55%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	83.5	56%	-	0.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	7.6	38%	-	0.0	2.6	ОК	
									Avera	qe	53%				

Table 25 BSP Analysis by the NEPCO Practice for IDECO in 202
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ii) After countermeasures Normal State Analysis Contingency State Analysi Installed Capacity N-1 Capad BSF Group BSP Group Operating rate (%) Load Transfer MVA Necessary for N-1 Observation Peak Demand 2020 Possible Load Transfer MVA N-1 Observa Check (Sı Load Transfer between BSPs [MVA] [MVA] % IRBID 80 80 80 0 0 240 160 198.9 83% 38.9 57.6 ОК 1 1 IRBID EAST 80 80 0 0 0 160 54% 6.5 22.3 ок 80 86.5 64% 1 HASAN IND 80 80 0 0 0 160 80 72.9 46% 0.0 24.6 ОК 2 REHAB 40 40 80 0 0 160 80 89.6 56% 9.6 34.3 ОК 2 MAFRAQ 80 80 80 0 0 240 160 71.4 30% 0.0 48.2 ок 42% 3 SABHA 40 40 0 0 0 80 40 36.4 46% 0.0 25.9 ОК DHULEIL 80 80 0 0 0 15.5 3 160 80 69.8 44% 0.0 ОК WAQAS 63 63 63 0 0 189 126 104.8 0.0 25.1 ОК 99 55% -ISHTAFINA 40 45 63 0 0 148 85 83.5 56% 0.0 14.0 ОК 99 -SAFAWI 10 10 0 0 0 10 0.0 2.6 99 20 7.6 38% ОК -Average 53%

i) No co	ountermeasu	ure													
505	505						Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of Ti	₹'s		Capacity	n roupdony	Peak Deman	d 2021	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transier between Dor a
1	IRBID	80	80	80	0	0	240	160	209.5	87%		49.5	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	91.2	57%	67%	11.2	22.3	ОК	
1	HASAN IND	80	30 80 0 0 0 40 40 80 0 0			0	160	80	76.8	48%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	94.4	59%		14.4	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	75.2	31%	44%	0.0	48.2	ОК	
3	SABHA	40	40	0	0	0	80	40	38.4	48%	44 %	0.0	25.9	ОК	
3	DHULEIL	80	80	0	0	0	160	80	73.6	46%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	110.4	58%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	88.0	59%	-	3.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.0	40%	-	0.0	2.6	ОК	
									Avera	ne	56%				

Table 26BSP Analysis by the NEPCO Practice for IDECO in 2021

Average 56%

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	l's		Capacity	N-1 Capacity	Peak Deman	nd 2021	Group	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPs
1	IRBID	80	80	80	0	0	240	160	209.5	87%		49.5	57.6	ОК	
1	IRBID EAST	80	80	0	0	0	160	80	91.2	57%	67%	11.2	22.3	ОК	
1	HASAN IND	80				0	160	80	76.8	48%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	94.4	59%		14.4	34.3	ОК	
2	MAFRAQ	80	80	80 80 0 0			240	160	75.2	31%	44%	0.0	48.2	ОК	
3	SABHA	40	40	0	0	0	80	40	38.4	48%		0.0	25.9	ОК	
3	DHULEIL	80	80	0	0	0	160	80	73.6	46%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	110.4	58%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	88.0	59%	-	3.0	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.0	40%	-	0.0	2.6	ОК	
									Avera	ae	56%				

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Frouping	BSP (Substation)		No	. of TF	l's		Capacity	Nº I Capacity	Peak Deman	nd 2022	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
p3	()						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	80	80	0	0	240	160	220.7	92%		60.7	57.6	No	
1	IRBID EAST	80	80	0	0	0	160	80	96.0	60%	71%	16.0	22.3	ОК	
1	HASAN IND	80	30 80 0 0 0 40 80 0 0 0			0	160	80	80.9	51%		0.9	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	99.4	62%		19.4	34.3	ОК	
2	MAFRAQ	80	0 80 80 0 0		240	160	79.2	33%	46%	0.0	48.2	ОК			
3	SABHA	40	40	0	0	0	80	40	40.4	51%		0.4	25.9	ОК	
3	DHULEIL	80	80	0	0	0	160	80	77.5	48%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	116.2	62%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	92.7	63%	-	7.7	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.4	42%	-	0.0	2.6	ОК	
									Avera	ae	59%				

Table 27 BSP Analysis by the NEPCO Practice for IDECO in 2022

	countermea						Installed		Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	l's		Capacity	N-1 Capacity	Peak Deman	d 2022	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	()						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	80	80	0	0	240	160	184.7	77%		24.7	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	148.0	62%	62%	0.0	22.3	ОК	Addition of 80MVA Transformer
1	HASAN IND	80	0 40 80 0 0			0	160	80	64.9	41%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	99.4	62%		19.4	34.3	ОК	
2	MAFRAQ	80	0 80 80 0 0			0	240	160	79.2	33%	46%	0.0	48.2	ок	
2	SABHA	40	40	0	0	0	80	40	40.4	51%	40%	0.4	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	77.5	48%		0.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	116.2	62%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	92.7	63%	-	7.7	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.4	42%	-	0.0	2.6	ОК	
									Avera	qe	54%				•

i) No co	ountermeasu	ure													
							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of Ti	R's		Capacity	N-1 Capacity	Peak Demar	nd 2023	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load mansier between bor s
1	IRBID	80	80	80	0	0	240	160	194.6	81%		34.6	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	155.9	65%	65%	0.0	22.3	ОК	
1	HASAN IND	80				0	160	80	68.3	43%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	104.7	65%		24.7	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	83.4	35%	49%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	42.6	53%		2.6	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	81.6	51%		1.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	122.5	65%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	97.6	66%	-	12.6	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	-	0.0	2.6	ОК	
									Avera	ae	57%				

Table 28BSP Analysis by the NEPCO Practice for IDECO in 2023

Average 57%

							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	l's		Capacity	N-1 Capacity	Peak Demar	nd 2023	Group	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	(,						[MVA]	[MVA]	[MVA]	%	Operating rate (%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	80	80	0	0	240	160	194.6	81%		34.6	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	155.9	65%	65%	0.0	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	68.3	43%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	104.7	65%		24.7	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	83.4	35%	49%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	42.6	53%		2.6	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	81.6	51%		1.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	122.5	65%	-	0.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	97.6	66%	-	12.6	14.0	ОК	
99	SAFAWI	10	10	0	0	0	20	10	8.9	44%	-	0.0	2.6	ОК	
						Avera	ae	57%							

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	. of TF	l's		Capacity	Nº I Capacity	Peak Deman	d 2024		Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
	()						[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSPS
1	IRBID	80	80	80	0	0	240	160	205.0	85%		45.0	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	164.3	68%	69%	4.3	22.3	ОК	
1	HASAN IND	80	80	0	0	0	160	80	72.0	45%		0.0	24.6	ОК	
2	REHAB	40	40	80	0	0	160	80	110.3	69%		30.3	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	87.9	37%	540/	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	44.9	56%	51%	4.9	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	86.0	54%		6.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	129.0	68%	-	3.0	25.1	ОК	
99	ISHTAFINA	40	45	63	0	0	148	85	102.8	69%	-	17.8	14.0	No	
99	SAFAWI	10	10	0	0	0	20	10	9.3	47%	-	0.0	2.6	ОК	
									Avera	ne.	60%				

Table 29BSP Analysis by the NEPCO Practice for IDECO in 2024

ii) After	countermea	asu	res												
							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
BSP Grouping	BSP (Substation)		No	o. of T	R's		Capacity	N=1 Capacity	Peak Demar	nd 2024	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load Transfer between BSFS
1	IRBID	80	80	80	0	0	240	160	205.0	85%		45.0	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	164.3	68%	69%	4.3	22.3	ОК	
1	HASAN IND 80 80 0 0 REHAB 40 40 80 0		0	160	80	72.0	45%		0.0	24.6	ОК				
2	REHAB	40	40	80	0	0	160	80	110.3	69%		30.3	34.3	ОК	
2	MAFRAQ	80	80	80	0	0	240	160	87.9	37%	51%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	44.9	56%		4.9	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	86.0	54%		6.0	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	129.0	68%	-	3.0	25.1	ОК	
99	ISHTAFINA	63	45	63	0	0	171	108	102.8	60%	-	0.0	14.0	ОК	BSP reinfocement (40→63)
99	99 SAFAWI 10 10 0 0 0 20			10	9.3	47%	-	0.0	2.6	ОК					
						Avera	ge	60%							

i) No co	ountermeasu	ıre														
BSP	BSP							Installed	N-1 Capacity	Norm	al State Ana	alysis			Contingency	State Analysis
Grouping	BSP (Substation)		N	o. of	TR'			Capacity	n roupdony	Peak Demar	nd 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
								[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	
1	IRBID	80	80	8	0	0	0	240	160	215.9	90%		55.9	57.6	ОК	
1	IRBID EAST	80	80	8	0	0	0	240	160	173.0	72%	73%	13.0	22.3	ОК	
1	HASAN IND	80	80	()	0	0	160	80	75.8	47%		0.0	24.6	ОК	
2	REHAB	40	40	8	0	0	0	160	80	116.2	73%		36.2	34.3	No	
2	MAFRAQ	80	80	8	0	0	0	240	160	92.6	39%	54%	0.0	48.2	ОК	
2	SABHA	40	40	()	0	0	80	40	47.3	59%		7.3	25.9	ОК	
2	DHULEIL	80	80	(0	0	160	80	90.6	57%		10.6	15.5	ОК	
99	WAQAS	63	63	6	3	0	0	189	126	135.9	72%	-	9.9	25.1	ОК	
99	ISHTAFINA	63	45	6	3	0	0	171	108	108.3	63%	-	0.3	14.0	ОК	
99	SAFAWI	10	10	()	0	0	20	10	9.8	49%	-	0.0	2.6	ОК	
							Avera	ge	63%							

Table 30BSP Analysis by the NEPCO Practice for IDECO in 2025

							Installed	N-1 Capacity	Norma	al State Ana	alysis			Contingency	State Analysis
BSP rouping	BSP (Substation)		No	. of TR			Capacity	N=1 Gapacity	Peak Deman	d 2025	Group Operating rate	Load Transfer MVA Necessary for N-1	Possible Load	N-1 Observation	Load Transfer between BSPs
							[MVA]	[MVA]	[MVA]	%	(%)	Observation	Transfer MVA	Check	Load manaler between Dor a
1	IRBID	80	80	80	0	0	240	160	179.9	75%		19.9	57.6	ОК	
1	IRBID EAST	80	80	80	0	0	240	160	173.0	72%	65%	13.0	22.3	ОК	
1	HASAN IND	80	80	80	0	0	240	160	111.8	47%		0.0	24.6	ОК	Addition of 80MVA transformer
2	REHAB	40	80	80	0	0	200	120	116.2	58%		0.0	34.3	ОК	40MVA
2	MAFRAQ	80	80	80	0	0	240	160	92.6	39%	51%	0.0	48.2	ОК	
2	SABHA	40	40	0	0	0	80	40	47.3	59%		7.3	25.9	ОК	
2	DHULEIL	80	80	0	0	0	160	80	90.6	57%		10.6	15.5	ОК	
99	WAQAS	63	63	63	0	0	189	126	135.9	72%	-	9.9	25.1	ОК	
99	ISHTAFINA	63	45	63	0	0	171	108	108.3	63%	-	0.3	14.0	ОК	
99 SAFAWI 10 10 0 0 0 20			10	9.8	49%	-	0.0	2.6	ок						
						Avera	ge	58%							

5.3 Draft BSP Plans

			JEPCO					EDCO					IDECO			Te	otal
Year	BSP Group	o Method	NEPCO Pr	actice	Difference	BSP Group M	Method	NEPCO P	ractice	Difference	BSP Group	Method	NEPCO P	ractice	Difference	BSP Group Method	NEPCO Practice
2016			Amman South New	80MVA	-80MVA			Karak	94MVA	-94MVA			Rehab	80MVA	-80MVA	MVA	254MVA
2017			QAIA New	80MVA	-80MVA			Qatrana	53MVA	-53MVA					MVA	MVA	133MVA
		1			MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
2018		1	Amman South	105MVA	-105MVA			Subeihi	34MVA	-34MVA					MVA	MVA	139MVA
			New Bayader	80MVA	-80MVA					MVA					MVA	MVA	80MVA
					MVA					MVA					MVA	MVA	MVA
2019			Ashrafia	80MVA	-80MVA					MVA			Irbid	37MVA	-37MVA	MVA	
			Muwaqar	80MVA	-80MVA					MVA					MVA	MVA	
			New BSP	240MVA	-240MVA					MVA					MVA	MVA	240MVA
2020	New Bayader	80MVA	Ashrafia	34MVA	46MVA	Karak	94MVA	Subeihi	17MVA	77MVA					MVA	174MVA	51MVA
	QAIA New		New BSP	240MVA	-160MVA					MVA					MVA	80MVA	240MVA
					MVA					MVA					MVA	MVA	MVA
2021					MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
2022	New BSP G1	240MVA			240MVA	New BSP	126MVA	New BSP	126MVA		Irbid East	80MVA	Irbid East	80MVA	MVA	446MVA	206MVA
	New BSP G5	240MVA			240MVA					MVA					MVA	240MVA	MVA
			† – – – – – – – – – – – – – – – – – – –		MVA					MVA		1			MVA	MVA	MVA
2023	Mwaqar	80MVA	New BSP	240MVA	-160MVA			Quweira	47MVA	-47MVA					MVA	80MVA	287MVA
	New BSP G4	240MVA		80MVA	160MVA	1		<u> ~ =c.nu</u>		MVA	1				MVA	240MVA	80MVA
	new bor or	2101111	Bilden	0011111	MVA					MVA					MVA	MVA	MVA
2024	Subeihi	51MVA	Abdoon	120MVA	-69MVA					MVA	Ishtafina	23MVA	Ishtafina	23MVA	MVA	74MVA	143MVA
2021	Bubblin		Zarqa, QAIA	180MVA	-180MVA					MVA		201111	10mmm	2011111	MVA	MVA	180MVA
			New BSP	240MVA	-240MVA					MVA					MVA	MVA	240MVA
2025	Abdali New	80MVA		240101 0 74	80MVA	Azrag	63MVA	Azrag	63MVA	MVA	Hassan Ind.	80MVA	Hassan Ind.	80MVA	MVA	223MVA	143MVA
2025	QAIA	80MVA			80MVA	/ wind	05111771	Aziaq	05141474	MVA	i i i i i i i i i i i i i i i i i i i	0011177	Rehab	40MVA	-40MVA	80MVA	40MVA
	QAIA		-		MVA					MVA			Kenab	40101 V A	MVA	MVA	
2026				240MVA						MVA					MVA	MVA	240MVA
2020				240141474	MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
2027	Crown 5	240MVA		80MVA	160MVA					MVA					MVA	240MVA	
2027	Group 5	2401VI V A		80IVI V A	MVA					MVA					MVA	MVA	
					MVA					MVA					MVA	MVA	MVA
2028	C	240MVA		560MVA						MVA					MVA	240MVA	560MVA
2028	Group 1	240MVA		SOUNIVA	-320MVA MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
2020	C	240MVA		240MVA	MVA MVA					MVA				80MVA	-80MVA	240MVA	320MVA
2029	Group 4	240MVA	·	240MVA	MVA MVA					MVA				80IVIVA	-80MVA MVA	240MVA MVA	320MVA MVA
					MVA MVA					MVA					MVA	MVA MVA	MVA MVA
2030	Crown 2	240MVA	├ ────┼	320MVA	-80MVA					MVA MVA				160MVA	-160MVA	240MVA	480MVA
2030	Group 2	240MVA 240MVA	++-	3201VIVA	-80MVA 240MVA					MVA MVA				TOUMVA	-160MVA MVA	240MVA 240MVA	
	Group 5	240MVA			240MVA MVA					MVA MVA		-			MVA MVA		MVA MVA
2021	Casua 6	1605074		240MVA	-80MVA			Ceaun 5	160MVA		Crown 1	160MVA			MVA 160MVA	MVA 320MVA	400MVA
2031	Group 6	160MVA	·	240MVA				Group 5	160MVA	-160MVA	Group 1	160MVA			160MVA MVA		
			<u> </u> -		MVA					MVA						MVA	MVA
2022	C	2402 6 11		001 874	MVA					MVA				001071	MVA	MVA	MVA
2032	Group 3	240MVA	·	80MVA						MVA				80MVA	-80MVA	240MVA	160MVA
					MVA					MVA					MVA	MVA	MVA
2022		2402.5	├	1000 8	MVA	·				MVA		1.00.0		000.000	MVA	MVA	MVA
2033	Group 5	240MVA	·	480MVA							Group 2	160MVA		80MVA	80MVA	400MVA	560MVA
	Group 1	240MVA	·		240MVA					MVA					MVA	240MVA	MVA
					MVA					MVA		-			MVA	MVA	MVA
2034	Group 4	240MVA		320MVA	-80MVA	Group 5	160MVA	Group 5	80MVA	80MVA		ļ		160MVA		400MVA	560MVA
		ļ	-		MVA					MVA					MVA	MVA	MVA
					MVA					MVA					MVA	MVA	MVA
		3,491MVA		4,439MVA	-948MVA		443MVA		674MVA	-231MVA		503MVA		900MVA	-397MVA	4,437MVA	6,013MVA

Table 1 Draft BSP Plans

5.4 Power Demand Forecast for each BSP

	BSP	BSP	Installed Capacity										Peak [Demand	(MVA)									
	Grouping	(Substation)	[MVA]	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	1	ABDOON	320	103	114	137	149	184	199	190	205	166	177	190	198	202	208	212	217	222	225	229	232	235
	1	AMMANS	215	94	103	109	119	98	106	112	120	98	105	113	118	120	123	126	129	131	134	136	138	139
	1	AMMANSNEW New BSP	240 240	145	159	121	131	138	118	124	133	115 118	123 126	132 135	137 141	140 144	144 148	147 152	150 155	153 158	156 160	159	161 165	163 168
	1	ASHRFIA	240	- 97	103	- 104	- 108	- 109	- 88	- 108	- 111	92	126	135	97	98	148	152	155	158	160	163 108	165	109
	2	MANARAH	240	46	51	54	59	63	126	149	163	172	173	187	197	213	231	251	272	294	317	341	366	393
	2	SAHAB	349	124	134	138	145	148	119	121	126	128	133	139	141	143	146	149	152	153	156	158	158	160
	2	MWQAR ABDALI	160 200	44 58	48 64	52 68	55 74	59 78	101 84	92 89	97 95	102 99	120 107	129 102	135 94	144 96	156 99	168 101	180 103	192 106	206 107	218 109	233 111	248 112
	3	ABDALI NEW	200	123	135	79	86	78 91	98	103	95	116	107	102	181	185	189	101	103	202	206	209	212	215
	3	HIZAM	320	0	0	120	127	134	141	148	156	165	173	189	175	184	194	204	215	227	239	251	265	279
	3	ZERQA	210	80	88		101	81	87	92	98	103	110	111	116	119	122	125	127	130	132	134	136	138
	3	ZERQATR5 New ZERQA	63 240	20	23	24	26	15 39	16 42	17	18 47	19 49	44 53	54 56	56 59	57 62	59 65	60 69	62 73	63 76	64 81	65 85	66 89	67 94
JEPCO	3	DHULEL	160	51	57	61	67	73	80	86	93	101	86	94	99	108	119	130	141	154	168	182	198	214
	4	CITY CENTER	240	107	118	127	138	147	186	196	212	212	182	197	207	224	243	264	286	308	333	358	384	412
	4	MARQA	268	172	180	125	129	129	132	131	157	156	131	133	131	133	136	138	141	143	144 211	146	148	149 277
	4 4	New BSP TAREQ	240 240	- 106	- 116	- 121	- 130	- 184	- 198	206	- 195	- 214	112 191	114 203	117 209	130 214	144 220	158 225	175 230	192 234	211 238	232 242	253 246	248
	5	BAYADER	400	169	186	198	215	178	203	199	213	175	187	200	209	214	219	225	229	234	238	242	245	248
	5	New BAYDER	240	-	-	80	87	91	104	181	194	167	179	191	200	204	209	214	219	223	227	231	234	237
	5	SALT UNIVERSITY	240 320	140 150	159 167	125 179	168 195	182 208	188 204	168 195	185 210	167 174	185 188	167 203	179 214	198 232	219 252	242 273	267 296	294 319	323 344	354 371	387 399	423 427
	5	New BSP	240	- 150	- 107	- 179	- 195	- 200	- 204	195	210	163	176	181	191	205	232	273	296	272	290	311	330	351
	5	SUBEIHI	349	110	119	124	105	105	112	115	119	123	130	169	174	179	179	183	188	188	192	192	197	197
	6	QAIA	90	12	13	14	16	17	19	21	23	25	27	30	80	89	98	108	119	132	144	158	173	189
	6	QAIA New MADABA SOUTH	240 240	83 89	93 98	102	81 144	88 153	98 164	106	117 186	126 194	168 179	185 193	174 176	192 189	213 204	235 219	259 235	285 251	313 268	343 286	376 304	410 323
	1	AQ A2	240	63	98	70	73	153	82	173	90	95	179	193	176	189	204	130	235	251	268	286 160	169	178
	1		160	29	30	32	33	35	37	39	41	43	46	48	51	53	56	59	62	66	69	73	77	81
	1	AQTH & NEW	286	42			49	51	54	57	60	63	67	70	74	78	82	86	91	96	101	106	112	118
	2	QUWEIRA	61	14 31	15 33		17 36	18 38	19 40	20 43	21	22 47	14	15 62	15 65	16 69	17	18 76	19 80	20 85	21 89	22 94	23 99	25
	3	EL HASA	126 50	31 23	25	35 26	36	38 29	40	43	45 17	47	59 19	62 20	65 21	69 22	23	76 24	80 26	27	89 29	94 30	99 32	104 33
	3	Tafila	160			- 20	-	- 23	15	16	17	18	18	19	20	22	23	24	25	27	28	30	31	33
	3	RASHADIA	96	28	29	31	33	34	36	38	40	42	45	47	49	52	55	58	61	64	68	71	75	79
	4	KARAK	57	41	43	35	37	39	41	44	46	48	51	54	57	60	63	66	70	73	77	81	86	90
	4	KARAK SOUTH SUBEIHI	160 189	27	29	39	51	54	56	60	63	66	70	73	77	81	86	90	95	100	105	111	117	123
EDCO	5	SWEMEH	240	71	75	79	83	87	92	97	102	107	113	119	126	132	139	147	155	163	172	181	190	201
	5	New BSP	126	-	-	-	-	-	-	-	-	50	53	55	58	62	65	68	72	76	80	84	89	93
	5	ISHTAFINA	165	61 77	64	68	71	75	79	84	88	73	77	81	85	89	94	99 145	105	110	116 170	122	129	136
	5	WAQAS QATRANA	189 36	18	81 19	85 20	90 11	94 11	99 12	105	110	106 14	112 15	118 16	124 16	131	138	145	153 20	161 21	170	179 24	188 25	198 26
	99	GHORSAFI	200	54	57	60	64	67	71	74	78	83	87	92	96	102	107	113	119	125	132	139	146	154
	99	MAAN	174	46	48	51	53	56	59	62	66	69	73	77	81	85	90	94	99	105	110	116	122	129
	99 99	AZRAQ SAFAWI	50 30	15	15	16	17	18	19	20	21	22	23	25	26 10	27	29 11	30 12	32 12	34	35	37	39 15	41 16
	99	RWESHID	30 20	6	6	6	6 5	5	5	5	8	8	9	9 7	10	10	11	12	12	13	13	14	15 10	16
	99	Shedia	80	8	51		57	60	63	66	70	73	77	81	86	90	95	100	106	111	117	123	130	137
	99	RESHA	25	3	4	4	4	4	4	5	5	5	5	6	6	6	7	7		8	8	9	9	10
	1	IRBID IRBID EAST	203 160	146 63	153 67	162 70	170 74	179 78	189 82	199 87	210 91	185 148	195 156	205 164	180 173	190 182	200 192	210 202	222 213	233 224	246 236	259 249	273 262	287 276
	1	HASAN IND	160	63 53	67 56	70 59	74 62	78 66	82 69	73	91 77	148	156 68	164 72	173	182	192	202	213	224	236	249	262	276
IDECO	2	REHAB	80	66	69	73	77	81	85	90	94	99	105	110	116	122	129	136	143	151	159	167	176	186
	2	MAFRAQ	240	52	55	58	61	64	68	71	75	79	83	88	93	98	103	108	114	120	126	133	140	148
	2	SABHA DHULEIL	80 160	27 51	28 54	30 57	31 60	33 63	35 66	36 70	38 74	40	43 82	45 86	47 91	50 95	52 101	55 106	58 112	61 118	65 124	68 130	72 137	75 145
	4	Fuheis	100	51	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
		M Cement		11	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Others		Q Cement		4	31		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
		Hashimiya Raiji Cement		0	39 39		39 39																	
		Muwaqar IND		0	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
			Total	3,273	3,769	3,965	4,227	4,439	4,734	4,967	5,271	5,533	5,873	6,220	6,501	6,823	7,179	7,557	7,948	8,353	8,778	9,218	9,680	10,158
						I			1	1														

Table 1 Power Demand Forecast for each BSP

Source: JICA Study Team

5.5 Countermeaser for each scenarios of power system plans

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV	Amman South-Bayader	147%	26km	150kUSD/km	3,900kUSD
Transmission line	Bayader-University (cable)	122%	6.9km	1,300kUSD/km	8,970kUSD
loading in N-1 state	Rehab-Samra	115%	25.67km	150kUSD/km	3,851kUSD
400kV Trasmission line loading in N-1 state	Aqaba-New Ma'an	111%	130km	395kUSD/km	51,350kUSD
400kV Substation loading in N-1 state	Amman South	183%	1Tr	4,230kUSD	4,230kUSD

Table 1 Oil-shale connection plan 1 (connect to Amman South-Amman East T/L) in 2019

Source: JICA Study Team

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV	Amman South-Bayader	-	-	-	-
Transmission line	Bayader-University (cable)	-	-	-	-
loading in N-1 state	Rehab-Samra	107%	25.67km	150kUSD/km	3,851kUSD
400kV Trasmission line loading in N-1 state	Aqaba-New Ma'an	110%	130km	395kUSD/km	51,350kUSD
400kV Substation loading in N-1 state	Amman South	-	-	-	-

Table 2 Oil-shale connection plan 2 (connect to QAIA substation) in 2019

Source: JICA Study Team

Table 3Oil-shale connection plan 3 (connect to New Qatrana Substation) in 2019

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV	Amman South-Bayader	119%	26km	150kUSD/km	3,900kUSD
Transmission line	Bayader-University (cable)	127%	6.9km	1,300kUSD/km	8,970kUSD
loading in N-1 state	Rehab-Samra	102%	25.67km	150kUSD/km	3,851kUSD
400kV Trasmission line loading in N-1 state	Aqaba-New Ma'an	108%	130km	395kUSD/km	51,350kUSD
400kV Substation loading in N-1 state	Amman South	135%	1Tr	4,230kUSD	4,230kUSD

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV	Amman South-Bayader	149%	26km	150kUSD/km	3,900kUSD
Transmission line	Bayader-University (cable)	117%	6.9km	1,300kUSD/km	8,970kUSD
loading in N-1 state	Rehab-Samra	106%	25.67km	150kUSD/km	3,851kUSD
400kV Trasmission line loading in N-1 state	Aqaba-New Ma'an	110%	130km	395kUSD/km	51,350kUSD
400kV Substation loading in N-1 state	Amman South	-	-	-	-

Table 4 Oil-shale connection plan 4 (connect to New QAIA Substation) in 2019

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	103%	12.1km	150kUSD/km	1,815kUSD
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	124%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	151%	26km	150kUSD/km	3,900kUSD
132kV	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
Transmission line loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
founding in ter i state	HIE-Hassan	-	-	-	-
	Manara-Amman South (replace to HTLS)	116%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-
	Amman South	146%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	102%	1Tr	4,230kUSD	4,230kUSD
loading in N-1 state	Amman North	106%	1Tr	4,230kUSD	4,230kUSD
	Amman West	-	-	-	-

 Table 5
 Nuclear connection plan 1 with oil-shale connection 1 in 2025

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	107%	12.1km	150kUSD/km	1,815kUSD
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	127%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	150%	26km	150kUSD/km	3,900kUSD
132kV	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
Transmission line loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
iouunig in i vi i suute	HIE-Hassan	-	-	-	-
	Manara-Amman South (replace to HTLS)	116%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	108%	21.07km	150kUSD/km	3,160kUSD
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-
	Amman South	-	-	-	-
400kV Substation	Amman East	102%	1Tr	4,230kUSD	4,230kUSD
loading in N-1 state	Amman North	103%	1Tr	4,230kUSD	4,230kUSD
	Amman West	-	-	-	-

 Table 6
 Nuclear connection plan 1 with oil-shale connection 2 in 2025

Table 7 Nuclear connection plan 1 with oil-shale connection 3 in 202	25
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Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	102%	12.1km	150kUSD/km	1,815kUSD
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	126%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	152%	26km	150kUSD/km	3,900kUSD
132kV	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
Transmission line loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
fouring in to t state	HIE-Hassan	-	-	-	-
	Manara-Amman South (replace to HTLS)	116%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-
	Amman South	143%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	102%	1Tr	4,230kUSD	4,230kUSD
loading in N-1 state	Amman North	103%	1Tr	4,230kUSD	4,230kUSD
	Amman West	-	-	-	-

	Ruelear connection plan z with c				
Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	-	-
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	131%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	151%	26km	150kUSD/km	3,900kUSD
132kV Transmission	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
line loading in N-1	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
state	HIE-Hassan	-	-	-	-
	Manara-Amman South (replace to HTLS)	116%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-
	Amman South	140%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	-	-	-	-
	Amman West	-	-	-	-

Table 8Nuclear connection plan 2 with oil-shale connection 1 in 2025

Table 9Nuclear connection plan 2 with oil-shale connection 2 in 2025						
Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost	
	Hizam-Manar	-	-	-	-	
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	949kUSD	
	Hizam-Samra (replace to HTLS)	137%	27.3km	113kUSD/km	3,085kUSD	
	Bayader-Amman South	151%	26km	150kUSD/km	3,900kUSD	
132kV Transmission	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD	
line loading in N-1	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD	
state	HIE-Hassan	-	-	-	-	
	Manara-Amman South (replace to HTLS)	117%	9.57km	113kUSD/km	1,081kUSD	
	Amman South-QAIA	103%	20.63km	150kUSD/km	3,095kUSD	
	QAIA-Madaba	109%	21.07km	150kUSD/km	3,160kUSD	
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-	
	Amman South	-	-	-	-	
400kV Substation	Amman East	-	-	-	-	
loading in N-1 state	Amman North	-	-	-	-	
	Amman West	-	-	-	-	

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	-	-
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	137%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	153%	26km	150kUSD/km	3,900kUSD
132kV Transmission	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
line loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
Suite	HIE-Hassan (add HTLS)	102%	15km	450kUSD/km	6,750kUSD
	Manara-Amman South (replace to HTLS)	117%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	-	-	-	-
	Amman South	138%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	-	-	-	-
	Amman West	101%	1Tr	4,230kUSD	4,230kUSD

 Table 10
 Nuclear connection plan 2with oil-shale connection 3 in 2025

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	_	-
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	142%	27.3km	113kUSD/km	3,085kUSD
132kV Transmission	Bayader-Amman South	152%	26km	150kUSD/km	3,900kUSD
line loading in N-1	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
	HIE-Hassan (add HTLS)	102%	15km	450kUSD/km	6,750kUSD
	Manara-Amman South (replace to HTLS)	117%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	110%	28km	395kUSD/km	11,060kUSD
	Amman South	142%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	103%	1Tr	4,230kUSD	4,230kUSD
	Amman West	-	-	-	-

 Table 11
 Nuclear connection plan 3 with oil-shale connection 1 in 2025

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	-	-
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	145%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	152%	26km	150kUSD/km	3,900kUSD
132kV Transmission line loading in N-1 state	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
	HIE-Hassan (add HTLS)	102%	15km	450kUSD/km	6,750kUSD
	Manara-Amman South (replace to HTLS)	117%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	103%	20.63km	150kUSD/km	3,095kUSD
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	111%	28km	395kUSD/km	11,060kUSD
	Amman South	-	-	-	-
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	-	-	-	-
	Amman West	-	-	-	-

 Table 12
 Nuclear connection plan 3 with oil-shale connection 2 in 2025

Table 13	Nuclear connection plan 3 with oil-shale connection 3 in 2025	
14010 15	Tradical connection plan 5 with on shale connection 5 in 2025	

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	-	-
	Hizam-Abdali (replace to HTLS)	189%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	144%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	153%	26km	150kUSD/km	3,900kUSD
132kV Transmission line	Marqa-Zarqa (replace to HTLS)	140%	11km	113kUSD/km	1,243kUSD
loading in N-1 state	HTPS-Zarqa (add HTLS)	119%	11km	450kUSD/km	4,950kUSD
	HIE-Hassan (add HTLS)	102%	15km	450kUSD/km	6,750kUSD
	Manara-Amman South (replace to HTLS)	117%	9.57km	113kUSD/km	1,081kUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	-	-	-	-
400kV Trasmission line loading in N-1 state	Samra-Amman North	110%	28km	395kUSD/km	11,060kUSD
	Amman South	138%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	-	-	-	-
	Amman West	-	-	-	-

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	-	-	-	-
	Hizam-Abdali (replace to HTLS)	196%	7.3km	113kUSD/km	825kUSD
	Hizam-Samra (replace to HTLS)	141%	27.3km	113kUSD/km	3,085kUSD
	Bayader-Amman South	Base case	26km	150kUSD/km	3,900kUSD
132kV	Marqa-Zarqa (replace to HTLS)	141%	11km	113kUSD/km	1,243kUSD
Transmission line	HTPS-Zarqa (add HTLS)	120%	11km	450kUSD/km	4,950kUSD
loading in N-1 state	HIE-Hassan (add HTLS)	108%	15km	450kUSD/km	6,750kUSD
	Manara-Amman South	127%	9.57km	113kUSD/km	1,081kUSD
	(replace to HTLS)	12/70	9.37KIII	115KUSD/KIII	1,001KUSD
	Amman South-QAIA	-	-	-	-
	QAIA-Madaba	101%	21.07km	150kUSD/km	3,161kUSD
400kV Trasmission line loading in N-1	Samra-Amman North		_	_	_
state	Suma Amman North				
	Amman South	100%	1Tr	4,230kUSD	4,230kUSD
400kV Substation	Amman East	-	-	-	-
loading in N-1 state	Amman North	102%	1Tr	4,230kUSD	4,230kUSD
	Amman West	-	-	-	-

 Table 14
 Nuclear connection plan 4 with oil-shale connection 4 in 2025

Table 15Nuclear behind schedule (2025)

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
	Hizam-Manar	129%	12.1km	150kUSD/km	1,815kUSD
132kV Transmission line	Hizam-Abdali (replace to HTLS)	111%	7.3km	113kUSD/km	825kUSD
loading in N-1 state	Amman South-QAIA	109%	20.63km	150kUSD/km	3,095kUSD
	QAIA-Madaba	115%	21.07km	150kUSD/km	3,160kUSD
400kV Trasmission line loading in N-1 state	New Qatrana-Qatrana	104%	28km	395kUSD/km	11,060kUSD
	Amman South	102%	1Tr	4,230kUSD	4,230kUSD
	Amman East		-	-	-
400kV Substation	Amman North	-	-	-	-
loading in N-1 state	Amman West	-	-	-	-
	Aqaba	143%	1Tr	4,230kUSD	4,230kUSD
	QAIA	123%	1Tr	4,230kUSD	4,230kUSD

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
400kV Trasmission line loading in N-1 state	New Ma'an-Aqaba	111%	130km	395kUSD/km	51,350kUSD

Table 16Nuclear on schedule (2030)

Table 17	Nuclear	behind	schedule	(2030)

Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV Trasmission line loading in N-1 state	QAIA-Madba	104%	21.07km	150kUSD/km	3,160kUSD
400kV Trasmission line loading in N-1 state	New Ma'an-Aqaba	111%	130km	395kUSD/km	51,350kUSD
400kV Substation loading in N-1 state	Aqaba	101%	1Tr	4,230kUSD	4,230kUSD

Source: JICA Study Team

Table 18	Nuclear on schedule and 5 years delay (20)34)

		Current	Length/	,	
Item	Line/Substation	rate	place	Unit cost	Cost
	Hizam-Abdali (replace to HTLS)	113%	7.3km	113kUSD/km	825kUSD
	Marqa-Zarqa (replace to HTLS)	122%	11km	113kUSD/km	1,243kUSD
	South Karak-Qatrana	117%	15.5km	150kUSD/km	2,325kUSD
132kV	Ashrafiah-Manara	118%	6.38km	150kUSD/km	957kUSD
Transmission line	Bayader-Amman South	103%	26km	150kUSD/km	3,900kUSD
loading in N-1 state	QAIA-Madaba	107%	21.07km	150kUSD/km	3,160kUSD
	Amman East-Manar	113%	9.58km	150kUSD/km	1,437kUSD
	Tareq-Amman North	110%	5.8km	150kUSD/km	870kUSD
	Suweimeh-Amman West	111%	35km	150kUSD/km	5,250kUSD
400kV Trasmission line loading in N-1 state	Amman North-Samra	113%	28km	395kUSD/km	11,060kUSD
	Amman South	-	-	-	-
	Amman East	-	-	-	-
	Amman North	-	-	-	-
400kV Substation	Amman West	103%	1Tr	4,230kUSD	4,230kUSD
loading in N-1 state	Aqaba	108%	1Tr	4,230kUSD	4,230kUSD
	QAIA	123%	1Tr	4,230kUSD	4,230kUSD
	Qatrana	101%	1Tr	4,230kUSD	4,230kUSD
	HIE	121%	1Tr	4,230kUSD	4,230kUSD

		•			
Item	Line/Substation	Current rate	Length/ place	Unit cost	Cost
132kV	Sabha-Dhuleil	103%	29km	150kUSD/km	4,350kUSD
Transmission line	Sabha-Mafraq	198%	32.2km	150kUSD/km	4,830kUSD
loading in N-1 state	Tareq-Amman North	111%	5.8km	150kUSD/km	870kUSD
400kV Trasmission line loading in N-1 state	New Qatrana-Qatrana	113%	28km	395kUSD/km	11,060kUSD
400kV Substation loading in N-1 state	Aqaba	116%	1Tr	4,230kUSD	4,230kUSD

Table 19 Nuclear on 10 years delay (2034)

Chapter 9 Environmental and Social Considerations

Та	ble 9.2		ison of SEA	Studies for	Generati	on Deve		an in JICA Pro	
Country (Region)	Year	Name of Project	Purpose	Generation Development	SEA-1	SEA-2	SEA Legislation	Major Environmental Item	Alternatives /Scenarios
Vietnam	2003	Master Plan	Support of	Thermal	Prioriti	Candid	Applying	Land	2 scenarios -
		Study on	the Peak	power (Gas,	zation	ate site	EU, World	acquisition/reset	(a)Hydropowe
		Pumped	Optimizatio	oil, coal),	of	for	Bank SEA	tlement, thermal	r and
		Storage	n Power	hydropower,	Power	pumpe	policies	effluent, air	(b)Thermal
		Power	Developme	pumped	Develo	d		pollution, ash,	power (coal
		Project and	nt Plan	storage	pment	storage		GHG emission	fired).In
		Optimizatio		hydropower,	Plans	power		etc.	conclusion,
		n for		renewable		generat			scenario (b)
		Peaking		energy (wind,		ion			was prioritized
		Power		solar),					considering
		Generation		transmission					factors such as
		in Vietnam		network					economic
									effect,
									abundant
									domestic
									energy
									resource,
									although likely
									causing more
									negative
									impact than
									than
									hydropower in
									terms of
									environmental
									and social
									considerations.
Sri Lanka	2006	Master Plan	Support to	Thermal	Prioriti	Candid	Based on	(1) Items of	3 scenarios -
		Study on	formulation	power (Gas,	zation	ate	the JICA	social	(a) No large
		the	of Power	oil, coal),	of	site/rou	Guidelines	environment,	scale thermal
		Developme	Developme	hydropower,	Power	te for		natural	power
		nt of Power	nt Master	pumped	Develo	hydrop		environment,	generation, (b)
		Generation	Plan	storage	pment	ower,		pollution	Hydropower

9.1 Appendix 9.2.1 SEA Studies for Generation Development Plan in JICA projects

Country (Region)	Year	Name of Project	Purpose	Generation Development	SEA-1	SEA-2	SEA Legislation	Major Environmental Item	Alternatives /Scenarios
		and		hydropower,	Plans	thermal			generation, (c)
		Transmissio		renewable		power			Thermal
		n System in		energy (wind,		(coal			power by
		Sri Lanka		solar),		fired)			natural gas.
				geothermal		generat			
				power,		ion and			
				transmission		transmi			
				network		ssion			
						networ			
						k			
Vietnam	2007	The Study	Technical	Thermal	Prioriti	Candid	Law on	Items of social	2 scenarios -
		on National	support to	power (Gas,	zation	ate sites	Environmen	environment,	(a) Selection
		Power	the 6th	oil, coal),	of	for	tal	natural	of hydropower
		Developme	National	hydropower,	Power	hydrop	Protection	environment	generation
		nt Plan for	Power	pumped	Develo	ower	2005	and pollution	sites with less
		the period	Developme	storage	pment	generat	Amended,		scale of
		of	nt Planning	hydropower,	Plans	ion	Decree		resettlement,
		2006-2015		renewable			No.80/2006		or import of
		in Vietnam		energy (wind,			/ND-CP		electricity, (b)
				solar),			(2006.8),		Change from
				transmission			Guidelines		thermal power
				network			(2006.8)		(imported
									coal) to
									hydropower or
									renewable
									energy.
Indonesia	2008	The Study	Support of	Thermal	Prioriti	Out of	Based on	(1) Items	2 scenarios -
(Sulawesi)		on	Optimal	power (Gas,	zation	scope	the JICA	independent on	(a)
		Optimal	Electric	oil, coal),	of		Guidelines	site location -	Economically
		Electric	Power	hydropower,	Power			air quality,	oriented, (b)
		Power	Developme	geothermal	Develo			GHG emission,	Utilizing local
		Developme	nt	power	pment			solid waste,	energy.
		nt			Plans			local economy	
		in Sulawesi						such as income	
		in the						and	
		Republic of						employment, (2)	
		Indonesia						Policy,	
								economy,	

Country (Region)	Year	Name of Project	Purpose	Generation Development	SEA-1	SEA-2	SEA Legislation	Major Environmental Item	Alternatives /Scenarios
								financial	
								condition and	
								technology, (3)	
								Environmental	
								items.	
Indonesia	2008	The Study	Support of	Thermal	Prioriti	Out of	Based on	(1) Amount of	(1) 4 scenarios
(Java-Mad		on Optimal	Optimal	power (Gas,	zation	scope	the JICA	NOx, SOx, CO ₂	- (a) Zero
ura-Bali)		Electric	Electric	oil, coal),	of		Guidelines	emissions, (2)	option, (b)
		Power	Power	hydropower,	Power			Air quality,	Thermal
		Developme	Developme	pumped	Develo			water quality,	power (coal),
		nt in	nt	storage	pment			GHG emission,	(c)
		Java-Madur		hydropower,	Plans			thermal effluent,	diversification
		a-Bali in the		renewable				river water use,	of power
		Republic of		energy (wind,				involuntary	generation, (d)
		Indonesia		solar), nuclear				resettlement,	reduction of
				power,					CO2 emission.
				transmission					(2) Evaluation
				network					indicators -
									reliability of
									power supply,
									cost,
									environmental
									and social
									considerations,
Vietnam	2010	Technical	Technical	Thermal	Review	Out of	Law on	Involuntary	All the
		Assistance	support of	power (Gas,	of SEA	scope	Environmen	resettlement,	generation
		for	the 6th	oil, coal),	study		tal	income, cultural	development
		Power	National	hydropower,	by		Protection	and heritage	plans (thermal
		Developme	Power	pumped	counter		2005	property,	power,
		nt Plan 7 in	Developme	storage	part		Amended,	biodiversity,	hydropower,
		Vietnam	nt Planning	hydropower,			Decree	natural	nuclear power,
				renewable			No.80/2006	resources,	renewable
				energy (wind,			/ND-CP	hydrological	energy, import
				solar), nuclear			(2006.8),	condition,	electricity etc.)
				power,			Guidelines	climate change,	
				transmission			(2006.8)	air pollution,	
				network,				solid waste,	
				import of				radioactive	

Country (Region)	Year	Name of Project	Purpose	Generation Development	SEA-1	SEA-2	SEA Legislation	Major Environmental Item	Alternatives /Scenarios
				electric power				substances,	
								hazard/risk,	
								landscape,	
								geology etc.	
Zambia	2010	The Study	Support of	Thermal	Prioriti	Candid	Based on	Involuntary	3 scenarios -
		for Power	Optimal	power (Gas,	zation	ate site	the JICA	resettlement,	(a) domestic
		System	Electric	oil, coal),	of	for	Guidelines	local economy,	energy sources
		Developme	Power	hydropower,	Power	pumpe		land use,	only, (b)
		nt	Developme	transmission/d	Develo	d		infectious	Import energy
		Master Plan	nt	istribution ne	pment	storage		diseases, air	resources and
		in Zambia		twork,	Plans	power		pollution, soil	power
				electric power		generat		contamination,	generation
				interchange		ion		solid waste,	within
								biodiversity	country, (c)
									Energy
									cooperation
									through SAPP
									(South African
									Power Pool).
Sri Lanka	2014	Developme	Support of	Thermal	Prioriti	Candid	(1) From	Air pollution,	(1) 1st
		nt Planning	Optimal	power (Gas,	zation	ate site	2006 all	water pollution,	screening - (a)
		on Optimal	Electric	oil, coal),	of	for	PPP are	GHG emission,	power
		Power	Power	hydropower,	Power	pumpe	requested to	eco-system,	generations
		Generation	Developme	pumped	Develo	d	conduct	involuntary	(hydropower,
		for Peak	nt	storage	pment	storage	SEA. (2)	resettlement,	thermal power,
		Demand in		hydropower,	Plans	power	SEA	water use, water	renewable
		Sri Lanka		renewable		generat	Guidelines	rights, fishery,	energy,
				energy (wind,		ion	(2009)	agriculture,	pumped
				solar), nuclear				tourism, human	storage etc. (b)
				power,				health	other options
				transmission					(IPP, demand
				network,					side
				power					management,
				cooperation					international
				with India,					transmission
				IPP					linkage with
									India other
									than power

Country (Region)	Year	Name of Project	Purpose	Generation Development	SEA-1	SEA-2	SEA Legislation	Major Environmental Item	Alternatives /Scenarios
									generation.
									(2) 2nd
									screening -
									hydropower
									(expansion),
									thermal power
									(LNGCC, gas
									turbine),
									pumped
									storage
									hydropower in
									terms of load
									following
									capability and
									power
									generation,
									environmental
									and social
									considerations,
									economic
									efficiency.

Source: Edited by the JICA Study Team referring to major cases of electric sector master plan study through JICA Projects

9.2 Appendix 9.4.1 Confirmation of Environmental and Social Considerations by JICA Environmental Checklist (Matrix of Main Check items vs. Generation Development Plans)

Table 9.4.1	Confirmation of Environmental and Social Considerations by JICA Environmental Checklist
	(Matrix of Main Check items vs. Generation Development Plans)

	Item		Т	herma	l Pow	er	er		wable ergy	ribution
Category	Environmental Item	Main Check Items	Gas	Oil	Coal	Oil Shale	Hydro Power	Wind Power	Solar Power	Transmission/Distribution
	stmits	a) Have reports (SEA/EIA) related to environmental impacts due to Policy/Plan/Program/Project (PPPPs) been already prepared in official process?	х	х	х	Х	х	Х	Х	х
	mental Pe	b) Have SEA/EIA reports been approved by authorities of the host country's government?	Х	Х	Х	Х	Х	Х	Х	Х
	(1) SEA/EIA and Environmental Permits	c) Have SEA/EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	Х	Х	Х	Х	Х	Х	Х	X
1) Permits and Explanation	(1) SEA	d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	х	х	х	х	х	Х	Х	х
1) Pern	(2) Explanation to relevant Stakeholders	a) Have contents of the PPPPs and the potential impacts been adequately explained to relevant stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?	x	x	x	х	x	X	X	x
	(2) Expl	b) Have the comment from the stakeholders been reflected to the PPPPs design?	Х	х	х	Х	Х	Х	Х	Х

	(3) Examination of Alternatives	a) Have alternative plans of the project been examined with social and environmental considerations?	X	х	х	Х	Х	Х	Х	х
		1) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted by the power plant operations comply with the country's emission standards? Is there a possibility that air pollutants emitted from the project will cause areas that do not comply with the country's ambient air quality standards? Are any mitigating measures taken?	x	x	x	х	-	-	-	-
		2) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), soot and dust emitted from the ships, vehicles and the facilities like docs comply with the country's emission standards? Are any mitigating measures taken?	Х	х	х	х	-	-	I	_
2) Pollution	(1) Air Quality	3) Do air pollutants, such as hydrogen sulfide (H ₂ S) emitted from geothermal power plants comply with the country's standards? Is there a possibility that the emitted hydrogen sulfide will have the impacts on the surrounding areas, including vegetation? Are any mitigating measures taken?	Х	х	х	Х	-	-	-	-
		4) In the case of coal-fired power plants, is there a possibility that fugitive dust from the coal piles, coal handling facilities, and dust from the coal ash disposal sites as well as open cast oils shale mining sites will cause air pollution? Are adequate measures taken to prevent the air pollution?	х	X	X	Х	-	-	-	-
		5) In the case of oil shale power plants, is there a possibility that fugitive dust from the open cast mining sites, and dust from disposal/stockpiling sites of mining and oil shale processing wastes will cause air pollution? Are adequate measures taken to prevent the air pollution?	-	-	Х	Х	-	-	-	-

	a1) Do effluents including thermal effluents from the power plant comply with the country's effluent standards? Is there a possibility that the effluents from the project will cause areas that do not comply with the country's ambient water quality standards or cause any significant temperature rise in the receiving waters?	Х	Х	х	Х	-	-	-	-
	b1) In the case of coal-fired power plants, doleachates from the coal piles and coal ash disposalsites comply with the country's effluent standards?	-	-	Х	-	-	-	-	-
	b2) In the case of geothermal power plants, is there any possibility that geothermal utilization will cause water pollution by toxicants, such as Arsenic (As) and Mercury (Hg) contained in geothermal fluids? If the water pollution is anticipated, are adequate measures considered?	-	-	X	X	-	-	-	-
	b3) In the case of oil shale power plants, is there apossibility that oil shale utilization willl causewater pollution by toxicantsts, such as Arsenic (As)and Mercury (Hg) contained in geothermal fluids?If the water pollution is anticipated, are adequatemeasures considered?	-	-	-	X	-	-	-	-
~	c) Are adequate measures taken to preventcontamination of surface water, soil, groundwater,and seawater by the effluents?	Х	Х	Х	Х	х	-	-	-
	d) Does the water quality of dam pond/reservoir comply with the country's ambient water quality standards? Is there a possibility that proliferation of phytoplankton and zooplankton will occur?	-	-	-	-	х	-	-	-
	e) Does the quality of water discharged from the dam pond/reservoir comply with the country's ambient water quality standards?	-	-	-	-	Х	-	-	-
	f) Are adequate measures, such as clearance of woody vegetation from the inundation zone prior to flooding planned to prevent water quality degradation in the dam pond/reservoir?	-	-	-	-	Х	-	-	-
	g) Is there a possibility that reduced the river flow downstream will cause water quality degradation resulting in areas that do not comply with the country's ambient water quality standards?	-	-	-	-	х	-	-	-

(2) Water Quality

	h) Is the discharge of water from the lower portion of the dam pond/reservoir (the water temperature of the lower portion is generally lower than the water temperature of the upper portion) planned by considering the impacts to downstream areas?	-	-	-	-	Х	-	-	-
	i) Is there any possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? If the water quality degradation is anticipated, are adequate measures considered?	Х	Х	х	х	Х	Х	Х	х
	 j) Do leachates from the waste disposal sites comply with the country's effluent standards and ambient water quality standards? Are adequate measures taken to prevent contamination of soil, groundwater, and seawater by leachates? 	Х	Х	Х	Х	Х	Х	х	x
	 k) Is there any possibility that effluent from well excavation would cause water contamination? If water pollution is anticipated, are adequate measures considered? 	-	-	Х	Х	-	-	-	-
	 1) Do pollutants, such as Suspended Soils (SS), oils/fats and other toxicants contained in effluents comply with the country's effluent standards (BOD, COD, ph, etc)? Is there a possibility that the effluents from the project will cause areas not to comply with the country's ambient water quality standards? 	X	X	X	X	X	_	_	-
	 m) Are adequate measures taken to prevent contamination of surface water, groundwater and soil by the effluents from storage areas, including raw materials, chemicals, and wastes? 	Х	Х	Х	Х	Х	-	-	-
(3) Wastes	a1) Are wastes, (such as waste oils, and waste chemical agents), coal ash, and by-product gypsum from flue gas desulfurization generated by the power plant operations properly treated and disposed of in accordance with the country's regulations?	X	X	X	X	X	-	-	-
	a2) Are wastes generated by the plant operations properly treated and disposed of in accordance with	Х	Х	Х	Х	Х	-	-	-

		the country's regulations (especially biomass								
		energy projects)?								
		b) Are earth and sand generated by excavation								
		properly treated and disposed of in accordance with	Х	Х	Х	Х	Х	-	-	-
		the country's regulations?								
		c) Do leachates from the waste disposal sites								
		comply with the country's effluent standards and								
		ambient water quality standards? Are adequate	Х	Х	Х	Х	Х	-	-	-
		measures taken to prevent contamination of soil,								
		groundwater, and seawater by leachates?								
		d) Are wastes (including hazardous wastes and								
		other industrial wastes) generated from the project								
		facilities properly treated and disposed of in	Х	Х	Х	Х	Х	-	-	-
		accordance with the country's regulations?								
		e) Are adequate measures taken to prevent	х	х	х	х	х	-	-	-
		contamination of soil and groundwater by leachates								
		from the waste storage/disposal sites?								
	(4) Soil Contamination	a) Has the soil in the project site been contaminated in the past? Are adequate measures taken to prevent soil contamination?	Х	х	х	х	х	Х	Х	х
	d Vibration	a) Do noise and vibrations comply with the country's standards?	Х	Х	Х	Х	Х	Х	Х	Х
	(5) Noise and Vi	b) In case of Wind Power Station, does low frequency noise comply with the environmental standard?	-	-	-	-	-	Х	-	-
	(6) Subsidence	a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	х	х	х	х	х	Х	Х	х
	(7) Odor	a) Are there any odor sources? Are adequate odor control measures taken?	Х	Х	Х	Х	Х	Х	Х	Х
3) Natural	(1) Protected Areas	a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	Х	Х	Х	Х	Х	Х	Х	x

	a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	X	X	X	Х	X	X	Х	х
	b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	Х	X	X	X	Х	X	X	Х
	c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	х	x	х	х	х	Х	Х	х
	d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	X	X	X	X	X	x	x	x
(2) Ecosystem	e) Is there a possibility that discharge of thermal effluents, intake of a large volume of cooling water or discharge of leachates will adversely affect the ecosystem of surrounding water areas?	Х	Х	Х	Х	Х	X	Х	X
(2) E	f) Is there a possibility that the project willadversely affect downstream aquatic organisms,animals, plants, and ecosystems? Are adequateprotection measures taken to reduce the impacts onthe ecosystem?	х	x	х	х	х	Х	Х	х
	g) Is there a possibility that installation of structures, such as dams will block the movement of the migratory fish species (such as salmon, trout and eel those move between rivers and sea for spawning)? Are adequate measures taken to reduce the impacts on these species?	Х	Х	Х	Х	Х	х	Х	х
	h) Is there any possibility that the project will cause the negative impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystem due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?	Х	х	Х	Х	Х	Х	Х	х
	i) Are adequate measures taken to prevent disruption of migration routes and habitat	Х	Х	Х	х	Х	Х	Х	х

	fragmentation of wildlife and livestock?								
	j) Are adequate measures taken to prevent								
	migration birds striking to transmission lines and	Х	Х	Х	Х	Х	Х	Х	Х
	towers?								
	k) In cases where the project site is located in								
	undeveloped areas, is there any possibility that the	x	х	х	х	х	х	х	х
	new development will result in extensive loss of								
	natural environments?								
	l) Is there a possibility that localized								
	micro-meteorological changes due to wind power								
	generation will affect valuable vegetation in the								
	surrounding areas (Is there valuable vegetation in	Х	Х	Х	Х	Х	Х	Х	Х
	the vicinity of the wind power generation								
	facilities)? If impacts on vegetation are anticipated,								
	are adequate measures considered?								
	m) Are the wind power generation facilities (wind								
	turbines) sited by considering the habitats and	х	Х	х	х	х	Х	х	х
	migration routes of sensitive or potentially affected								
	bird species?								
	a) Is there a possibility that hydrologic changes due								
	to installation of the structures, such as weirs will	Х	Х	Х	Х	Х	Х	Х	Х
gy	adversely affect the water flows, waves and tides?								
(3) Hydrology	b) Is there a possibility that hydrologic changes due								
Hyd	to the installation of structures, such as weirs will								
(3)	adversely affect the surface and groundwater flows	Х	Х	Х	Х	Х	Х	Х	Х
	(especially in "run of the river generation"								
	projects)?								
	a) Is there any soft ground on the route of power								
	transmission and distribution lines that may cause								
	slope failures or landslides? Are adequate measures	Х	Х	Х	Х	Х	Х	Х	Х
	considered to prevent slope failures or landslides,								
ology	where needed?								
l Gec	b) Is there a possibility that the project will cause a								
y and	large-scale alteration of the topographic features	Х	Х	Х	Х	Х	Х	Х	Х
(4) Topography and Geology	and geologic structures in the surrounding areas?								
godo	c) Is there any possibility that civil works, such as								
(4) T	cutting and filling will cause slope failures or	Х	Х	Х	Х	Х	Х	Х	Х
Ŭ	landslides? Are adequate measures considered to								
	prevent slope failures or landslides?								
	d) Is there a possibility that soil runoff will result	Х	Х	Х	Х	Х	Х	Х	Х
	from cut and fill areas, waste soil disposal sites,								

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from cut and fill areas, waste soil disposal sites, X X X X X X X X X	
	х
measures taken to prevent soil runoffs?	
i) In the case of offshore projects, is there any	
possibility that the project will erode natural X X X X X X X X	Х
beaches?	
a) Is involuntary resettlement caused by project	
implementation? If involuntary resettlement is X X X X X X X X X	х
caused, are efforts made to minimize the impacts	
te caused by the resettlement?	
b) Is adequate explanation on compensation and	
$\begin{bmatrix} 2 \\ m \\ m \\ m \\ m \\ m \\ m \\ m \\ m \\ m \\$	Х
time caused by the resettlement? Image: Comparison of the company	
$\left \begin{array}{c} \sigma \\ \overline{\sigma} \\ \overline{\sigma} \end{array} \right $ c) Is the resettlement plan, including compensation	
with full replacement costs, restoration of X X X X X X X X X	х
livelihoods and living standards developed based	
on socioeconomic studies on resettlement?	

	d) Are the compensations going to be paid prior to the resettlement?	Х	Х	Х	Х	Х	Х	Х	х
	e) Are the compensation policies prepared in document?	Х	Х	Х	Х	х	Х	Х	х
	f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?	х	Х	х	х	Х	Х	х	х
	g) Are agreements with the affected people obtained prior to resettlement?	Х	Х	Х	Х	Х	Х	Х	х
	h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	х	х	х	х	х	Х	Х	х
	i) Are any plans developed to monitor the impacts of resettlement?	Х	Х	Х	Х	Х	Х	Х	Х
	j) Is the grievance redress mechanism established?	Х	Х	Х	Х	Х	Х	Х	Х
	a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	х	Х	х	х	х	Х	Х	Х
(2) Living and Livelihood condition	b) Is sufficient infrastructure (e.g., hospitals, schools, and roads) available for the project implementation? If the existing infrastructure is insufficient, are any plans developed to construct new infrastructure or improve the existing infrastructure?	X	Х	Х	X	X	X	х	Х
(2) Living and L	c) Is there a possibility that large vehicles traffic for transportation of materials, such as raw materials and products will have impacts on traffic in the surrounding areas, impede the movement of inhabitants, and any cause risks to pedestrians?	х	х	х	х	х	Х	х	х
	d) Is there a possibility that diseases, including infectious diseases, such as HIV, will be brought due to the immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?	Х	Х	Х	Х	Х	Х	Х	Х

	e) Is there a possibility that the amount of water used (e.g., surface water, groundwater) and discharge of thermal effluents by the project will adversely affect existing water uses and uses of water areas (especially fishery)?	x	х	x	х	x	х	х	x
	f) Is there any possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	Х	Х	Х	Х	X	X	Х	х
	g) Is there any possibility that the project causes the change of land uses in the neighboring areas to affect adversely livelihood of local people?	Х	Х	Х	Х	Х	Х	Х	х
	h) Is there any possibility that the project facilities adversely affect the traffic systems?	Х	Х	Х	Х	Х	Х	Х	х
	 i) Is there any possibility that diseases, including infectious diseases, such as HIV, will be brought due to the immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? 	-	-	-	-	х	-	-	-
	j) Is the minimum flow required for maintaining downstream water uses secured?	-	-	-	-	Х	-	-	-
	k) Is there any possibility that reductions in water flow downstream or seawater intrusion will have impacts on downstream water and land uses?	-	_		_	х	-	-	-
	 Is there any possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, and filariasis) will be introduced? 	-	-	-	-	Х	-	-	-
	m) Is there any possibility that fishery rights, water usage rights, and common usage rights, etc. would be restricted?	-	-	-	-	Х	-	-	-
(3) Heritage	a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	х	Х	Х	Х	х	Х	Х	х
(4) Landscape	a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	Х	Х	Х	Х	х	Х	Х	х

	(5) Ethnic Minorities and Indigenous Peoples	a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources	x x	X X	x x	X X	x x	x x	x x	x x
	(5) E Ir	respected?								
		a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	Х	Х	Х	Х	Х	Х	X	х
	(6) Working Conditions	b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?	х	Х	х	Х	х	Х	х	х
	(6) Working	c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?	х	Х	х	Х	х	Х	Х	X
		d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	Х	Х	х	Х	Х	Х	Х	X
	struction	a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	х	х	х	х	х	Х	Х	х
	(1) Impacts during Construction	b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce the impacts?	Х	Х	х	Х	х	Х	Х	х
5) Others	(1) Impa	c) If construction activities adversely affect the social environment, are adequate measures considered to reduce the impacts?	х	Х	х	Х	х	Х	Х	x
5	(2) Accident Prevention Measures	a) In the case of coal-fired power plants, are adequate measures planned to prevent spontaneous combustion at the coal piles (e.g., sprinkler systems)?	Х	Х	х	Х	Х	X	Х	X
	(2) Accident Pre-	b) In the case of oil shale power plants, are adequate measures planned to prevent spontaneous combustion at the coal piles (e.g., sprinkler systems)?	Х	Х	Х	Х	X	Х	Х	х

	c) Does the project have any accident prevention equipments and scheme to store, emit and transport toxic and hazardous materials?	Х	Х	X	х	X	Х	Х	х
	a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	Х	х	х	х	Х	х	х	х
	b) What are the items, methods and frequencies of the monitoring program?	Х	Х	Х	х	Х	Х	Х	Х
(3) Monitoring	c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	X	X	X	X	X	X	X	х
	d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	X	X	X	Х	X	Х	Х	х
Reference to Checklist of Other Sectors	 a) Where necessary, pertinent items described in the Power Transmission and Distribution Lines, Road checklist should also be checked (e.g., projects including installation of electric transmission lines and/or electric distribution facilities). 	X	X	X	х	X	Х	х	x
(4) Reference to Ch	 b) Where necessary, pertinent items described in the associated infrastructures such as ports/harbors, roads, railways checklist should also be checked (e.g., projects including construction of port and harbor facilities). 	х	х	Х	Х	х	Х	х	х
(5) Note on Using Environmental Checklist	a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, and global warming).	x	x	х	X	х	х	X	х

Note: Items with {x} mark should be checked whether some relation and/or a possibility of causing adverse impacts in terms of environmental and social considerations. Source: JICA Study Team

9.3 Appendix 9.4.2 Results of SEA Level Check for Each Generation Development Plan

Che	ck Items relevant to	Check Items of		
		Environmental	Rating*	Reasons
	Plan	Impacts	8	
		P		
(1) Pla	nning Process			
1	Contents of PPPs (Poli including technical, ec aspects, and alternative	onomic and financial	С	Maturity of technology, cost etc.
2	Baseline environmenta	l information	С	Nationwide environmental data (especially land use and water use)
3	Consistency with uppe PPPs	r PPPs/other development	С	Tourism development plan, regional environmental management plan
4	Consultation with relev	vant stakeholders	С	Stakeholders to be subjected
5	Information disclosure		С	Contents of disclosure and timing
6	Permit/approval			Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)
(2) Ite	ms inherent in the Gene	eration Development Plan	(Operatio	n stage, without site location)
1) L	and/resource/related in	frastructure		
1	Use of land/space/right-of-w ay	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	A	Land for power plant and related facilities
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	А	Use of natural gas or LNG
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	А	Process, cooling, wastewater treatment, sprinkling for ash, drinking etc.
4	Associated structures/facilities relating to storage,	Hazardous waste storage/disposal sites, gas pipeline etc.	В	Storage of ash, reservoir, power plant and related facilities

 Table 1
 Environmental Check Items for IEE in PPP level SEA

	transport etc.					
2) G	2) Generation of Pollutants, Risk, Disturbance etc.					
1	Emission of air pollutants	Air quality	А	Air pollutants including toxic /hazardous components		
2	Discharge of wastewater including thermal effluents	Water quality	В	Water pollutants including toxic /hazardous components		
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	А	Solid wastes including toxic /hazardous components		
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	В	Noise and vibration by extraction and burning		
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	А	Emission of CO ₂ , CH ₄ etc.		
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	В	Transboundary pollution by air pollutants		
7	Disturbance/nuisance	Accidents etc.	А	Safety and security management extraction and power generation		
(3) Im	pacts due to Electric G	eneration Development Pl	an as a wh	ole (Site specific, based on detailed plan)		
1) N	atural Environment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific		
2) S	ocial Environment	Living and health conditions of local communities and Jordan people	С	In general site specific		
3) C	onstruction Work	Pollution (air, water, noise and vibration,	С	Based on detailed plan		

	solid waste etc.)		
4) Decommissioning	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan

Note: $\{A\}$ - Item with Significant adverse impact is anticipated. $\{B\}$ - Item with not significant but considerable adverse impact is anticipated. $\{C\}$ - (i) Item that adverse impact is unknown at present. However, it needs to re-examine extent of impact later. (ii) Item that little impact is anticipated at present. However, there is a possibility to increase in extent of impact later. $\{D\}$ - No or negligible impact is expected. Source: JICA Study Team

(2) Thermal Power Generation - Oil

way

	Check Items relevant to Generation Development Plan Check Items of Environmental Impacts		Rating*	Reasons
(1) P	Planning Process		I	
1	Contents of PPPs (Policy/Plan/Program) including technical, economic and financial aspects, and alternatives		С	Maturity of technology, cost etc.
2	Baseline environmental information		С	Nationwide environmental data (especially land use and water use)
3	Consistency with upper PPPs/other development PPPs		С	Tourism development plan, regional environmental management plan
4	Consultation with relevant stakeholders		С	Stakeholders to be subjected
5	Information disclosure		С	Contents of disclosure and timing
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)
(2) Items inherent in the Generation Development Plan (Operation stage, without site location)				
1) Land/resource/related infrastructure				
1	Use of land/space/right-of-	Land acquisition, resettlement, leasing, easement/ wayleaves,	А	Land for power plant and related facilities

migration of population

2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	А	Use of crude oil or diesel oil	
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	А	Process, cooling, wastewater treatment, sprinkling for ash, drinking etc.	
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	В	Storage of ash, reservoir, power plant and related facilities	
2)	Generation of Polluta	nts, Risk, Disturbance etc.	I		
1	Emission of air pollutants	Air quality	А	Air pollutants including toxic /hazardous components	
2	Discharge of wastewater including thermal effluents	Water quality	В	Water pollutants including toxic /hazardous components	
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	А	Solid wastes including toxic /hazardous components	
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	В	Noise and vibration by extraction and burning	
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	А	Emission of CO ₂ , CH ₄ etc.	
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	В	Transboundary pollution by air pollutants	
7	Disturbance/nuisanc e	Accidents etc.	А	Safety and security managmeent extraction and powe r generation	
. ,	(3) Impacts due to Electric Generation Development Plan as a whole (Site specific, based on detailed plan)				
1)	Natural	Protected areas, Important Bird and Biodiversity	С	In general site specific	

Environment	Area (IBA), special conservation area etc.		
2) Social Environment	Living and health conditions of local communities and Jordan people	С	In general site specific
3) Construction Work	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan
4) Decommisioning	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan

(3) Thermal Power Generation - Coal Fired

	Check Items relevant to Generation Development Plan Check Items of Environmental Impacts		Rating*	Reasons		
(1) P	(1) Planning Process					
1	Contents of PPPs (Policy/Plan/Program) including technical, ecomonic and financial aspects, and alternatives		С	Maturity of technology, cost etc.		
2	Baseline environmental information		С	Nationwide environmental data (especially land use and water use)		
3	Consistency with upper PPPs/other development PPPs		С	Tourism development plan, regional environemental management plan		
4	Consultation with relevant stakeholders		С	Stakeholders to be subjected		
5	Information disclosure		С	Contents of dsiclosure and timing		
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)		

(2) Items inherent in the Generation Develeopment Plan (Operation stage, without site location)				
1)	Land/resource/related	infrastructure		
1	Use of land/space/right-of- way	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	А	Land for generation plant, coal storage site, coal ash pond,
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	A	Use of coal
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	А	Process, cooling, wastewater treatment, sprinkling for ash,drinking etc.
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	В	Storage of ash, reservoir, power plant and related facilities
2)	Generation of Polluta	nts, Risk, Disturbance etc.		
1	Emission of air pollutants	Air quality	А	Air pollutants including toxic /hazardous components
2	Discharge of wastewater including thermal effluents	Water quality	В	Water pollutants including toxic /hazardous components
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	А	Solid wastes including toxic /hazardous components
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	В	Noise and vibration by extraction and burning
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	А	Emission of CO ₂ , CH ₄ etc.
6	Movement of pollutants/waste, cross-border resource and	Transboundary pollution	В	Transboundary pollution by air pollutants

	migration			
7	Disturbance/nuisanc e	Accidents etc.	А	Safety and security managmeent extraction and power generation
(3) Ir plan)	-	Generation Development Pl	an as a wh	ole (Site specific, based on detailed
,	Natural ronment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific
2)	Social Environment	Living and health conditions of local communities and Jordan people	С	In general site specific
3)	Construction Work	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan
4)	Decommisioning	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan

(4) Oil Shale Burning Power Generation

	ck Items relevant to ration Development Plan	Check Items of Environmental Impacts	Rating*	Reasons	
(1) Pl	(1) Planning Process				
1	Contents of PPPs (Policy/Plan/Program) including technical, ecomonic and financial aspects, and alternatives		С	Maturity of technology, cost etc.	
2	Baseline environmental information		С	Nationwide environmental data (especially land use and water resourecs), distribution data of oil shale mining in Jordan	
3	Consistency with upper PPPs/other development PPPs		С	Tourism development plan, regional environemental management plan	

4	Consultation with rel	evant stakeholders	C	Stakeholders to be subjected
5	Information disclosure		С	Contents of dsiclosure and timing
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)
		-	n (Operat	tion stage, without site location)
1).	Land/resource/related	Infrastructure		
1	Use of land/space/right-of- way	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	А	Use of oil shale mining in Jordan
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	А	Extraction of shale oil and power generation by burning
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	A	Process, cooling, wastewater treatment, sprinkling for ash, drinking etc.
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	В	Storage of ash, reservoir, power plant and related facilities
2)	Generation of Polluta	nts, Risk, Disturbance etc.		
1	Emission of air pollutants	Air quality	A	Air pollutants including toxic /hazardous components
2	Discharge of wastewater including thermal effluents	Water quality	В	Water pollutants including toxic /hazardous components
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	A	Solid wastes including toxic /hazardous components
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	В	Noise and vibration by extraction and burning

5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	A	Emission of CO ₂ , CH ₄ etc.	
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	В	Transboundary pollution by air pollutants	
7	Disturbance/nuisan ce	Accidents etc.	А	Safety and security managmeent extraction and power generation	
	(3) Impacts due to Electric Generation Development Plan as a whole (Site specific, based on detailed plan)				
	Natural conment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific	
2) \$	Social Environment	Living and health conditions of local communities and Jordan people	С	In general site specific	
3) Construction Work		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan	
4)]	Decommisioning	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan	

(5) Pumping Storage Hydropower Generation

Check Items relevant to Generation Development Plan		Check Items of Environmental Impacts	Rating*	Reasons					
(1) F	(1) Planning Process								
1	Contents of PPPs (Policy/Plan/Program) including technical, ecomonic and financial aspects, and alternatives		С	Maturity of technology, cost etc.					
2	Baseline environmental information		С	Environmental baseline data of Aqaba bay area					
3	Consistency with upper PPPs/other development PPPs		С	Tourism development plan, regional environemental management plan					
4	Consultation with relevant stakeholders		С	Stakeholders to be subjected					
5	Information disclosure		С	Contents of dsiclosure and timing					
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)					
	(2) Items inherent in the Generation Development Plan (Operation stage, without site location) 1) Land/resource/related infrastructure								
1	Use of land/space/right-of-way	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	A	Land for sea water reservoir in inland area					
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	D	No use					
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	В	Use of sea water					
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	С	Storage of ash, reservoir, power plant and related facilities					

2)	Generation of Pollutants	, Risk, Disturbance etc.		
1	Emission of air pollutants	Air quality	D	Not expectd
2	Discharge of wastewater including thermal effluents	Water quality	В	Marine water pollution by intake and circulating sea water
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	D	Not expectd
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	С	Generation of noise and vibration
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	D	Not expectd
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	D	Not expectd
7	Disturbance/nuisance	Accidents etc.	С	Little expected
(3) I	mpacts due to Electric Ge	eneration Development Plan a	is a whole	(Site specific, based on detailed plan)
1) Natural Environment		Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific
2) Social Environment		Living and health conditions of local communities and Jordan people	С	In general site specific
3) Construction Work		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan
4) Decommisioning		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan

(6) Wind Power Generation

Check Items relevant to Generation Development Plan		Check Items of Environmental Impacts	Rating*	Reasons							
(1) F	(1) Planning Process										
1	Contents of PPPs (Policy technical, ecomonic and alternatives	/Plan/Program) including financial aspects, and	С	Maturity of technology, cost etc.							
2	Baseline environmental i	nformation	С	Nationwide environmental data (especially land use, topographic, meteorological data)							
3	Consistency with upper I	PPPs/other development PPPs	С	Tourism development plan, regional environemental management plan							
4	Consultation with relevan	nt stakeholders	C	Stakeholders to be subjected							
5	Information disclosure		С	Contents of dsiclosure and timing							
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)							
	tems inherent in the Gen Land/resource/related in	eration Develeopment Plan (Op nfrastructure	eration sta	ge, without site location)							
1	Use of land/space/right-of-way	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	А	Land/space for installation of wind generators							
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	D	No use							
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	D	Not expected							
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	D	Not expected							

2)	Generation of Pollutants	s, Risk, Disturbance etc.		
1	Emission of air pollutants	Air quality	D	No emission of air pollutans
2	Discharge of wastewater including thermal effluents	Water quality	D	No discharge of water pollutans
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	D	No generation of soild waste
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	В	Some possibility of noise and low frequency sound
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	D	No emission of greenhouse gases
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	D	Not expected
7	Disturbance/nuisance	Accidents etc.	D	Not expected
(3) I	mpacts due to Electric G	eneration Development Plan as a	a whole (S	ite specific, based on detailed plan)
1)	Natural Environment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific
2) Social Environment		Living and health conditions of local communities and Jordan people	С	In general site specific
3) Construction Work		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan
4) Decommisioning		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan

(7) Solar Power Generation

	heck Items relevant to eneration Development Plan Check Items of Environmental Impa-		Rating*	Reasons							
(1)	(1) Planning Process										
1	Contents of PPPs (Policy/Plan/Program) including technical, ecomonic and financial aspects, and alternatives		С	Maturity of technology, cost etc.							
2	Baseline environmental	information	С	Nationwide environmental data (especially land use, topographic, meteorological data)							
3	Consistency with upper	PPPs/other development PPPs	С	Tourism development plan, regional environemental management plan							
4	Consultation with releva	nt stakeholders	С	Stakeholders to be subjected							
5	Information disclosure		С	Contents of dsiclosure and timing							
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)							
	Items inherent in the Ge) Land/resource/related	neration Develeopment Plan (Op infrastructure	peration sta	nge, without site location)							
1	Use of land/space/right-of-wa y	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	А	Land/space for installation of solar panels							
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	D	No use							
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	D	Not expected							
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	В	3 Storage of disposed solar panel							

2	2) Generation of Pollutants, Risk, Disturbance etc.								
1	Emission of air pollutants	Air quality	D	No emission of air pollutans					
2	Discharge of wastewater including thermal effluents	Water quality	D	No discharge of water pollutans					
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	В	Generation of hazardous waste by disposal of dilapidated solar panel					
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	D	Some possibility of low frequency vibration					
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	D	No emission of greenhouse gases					
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	D	Not expected					
7	Disturbance/nuisance	Accidents etc.	D	Not expected					
(3)	Impacts due to Electric (Generation Development Plan as	a whole (S	Site specific, based on detailed plan)					
1) Natural Environment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific					
2) Social Environment	Living and health conditions of local communities and Jordan people	С	In general site specific					
3) Construction Work	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan					
4) Decommisioning		Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan					

(8) Transmission and Distributon Line

Check Items relevant to Generation Development Plan		Check Items of Environmental Impacts	Rating*	Reasons		
(1) Pl	lanning Process					
1	Contents of PPPs (Policy technical, ecomonic and alternatives	//Plan/Program) including financial aspects, and	С	Maturity of technology, cost etc.		
2	Baseline environmental	information	С	Baseline data, especially for land use, natural conservation		
3	Consistency with upper	PPPs/other development PPPs	С	Tourism development plan, regional environemental management plan		
4	Consultation with releva	nt stakeholders	С	Stakeholders to be subjected		
5	Information disclosure		С	Contents of dsiclosure and timing		
6	Permit/approval		С	Procedures of approval, responsible agencies (NEPCO, MEMR, MoEnv, MoPIC, ASEZA etc.)		
(2) It	ems inherent in the Gene	eration Develeopment Plan (Op	eration sta	ge, without site location)		
1)	Land/resource/related in	frastructure				
1	Use of land/space/right-of-wa y	Land acquisition, resettlement, leasing, easement/ wayleaves, migration of population	В	Land/space for transmission line, substation		
2	Use of energy resources	Fuel (gas, oil, coal, oil shale etc.)	D	No use		
3	Use of water resources (surface and underground water, wastewater)	Surface water, groundwater and wastewater	D	Not expected		
4	Associated structures/facilities relating to storage, transport etc.	Hazardous waste storage/disposal sites, gas pipeline etc.	D	Not expected		
2)	Generation of Pollutants	, Risk, Disturbance etc.	<u> </u>	1		

1	Emission of air pollutants	Air quality	D	No emission of air pollutans
2	Discharge of wastewater including thermal effluents	Water quality	D	No discharge of water pollutans
3	Generation of solid waste	Storage and disposal of industrial solid waste, hazardous waste etc.	D	No generation of soild waste
4	Generation of noise and vibrations	Ambient noise, low frequency vibration	С	Some possibility of low frequency vibration
5	Emission of greenhouse gases (CO ₂ , CH ₄ etc.)	Global warming, climate change	D	No emission of greenhouse gases
6	Movement of pollutants/waste, cross-border resource and migration	Transboundary pollution	D	Not expected
7	Disturbance/nuisance	Accidents etc.	С	Effect of electro-magnetic field
(3) In	npacts due to Electric Ge	eneration Development Plan as a	a whole (S	ite specific, based on detailed plan)
1)	Natural Environment	Protected areas, Important Bird and Biodiversity Area (IBA), special conservation area etc.	С	In general site specific
2)	Social Environment	Living and health conditions of local communities and Jordan people	С	In general site specific
3)	Construction Work	Pollution (air, water, noise and vibration, solid waste etc.)	С	Based on detailed plan
4) Decommisioning		sioning Pollution (air, water, noise and vibration, solid waste etc.) C Base		Based on detailed plan
		•		Source: IICA Study Team

9.4 Appendix 9.4.3 Preliminary Environmental Scoping for Generation Development Plans

Stage of Implem entation	Activities		Thermal Power				Renewable Energy		Transmission Line
		Gas	Oil	Coal	Oil Shale	Hydropower*	Wind	Solar	Tran
_	Securing land/space for power plants and related facilities	x	х	х	х	х	x	x	x
I Pre-Con	Change of land/resource use	х	х	х	х	х	х	х	х
structio	Securing energy resources	x	х	х	х	х	-	-	-
n Stage	Securing water resources	х	х	х	х	х			
	Securing associated facilities/structures	х	х	х	х	х	-	-	-
	Procurement of construction materials and securing water supply	x	X	X	X	X	X	x	x
II	Earth moving work such as excavation, cutting and mounting	x	Х	Х	X	X	X	х	х
Constru ction	Construction work for power plant and related facilities	х	х	х	х	х	х	x	x
Stage	Operation of construction machines, vehicles and plants etc.	x	X	X	X	X	X	X	x
	Residence of construction workers and their working activities	x	x	х	x	х	x	x	x
	Operation of power plants and related facilities	х	х	х	х	х	х	х	х
III Operati	Spatial occupancy of power plants and related facilities	x	X	X	X	X	X	X	x
on Stage	Operation of associated facilities/structures	x	х	x	х	х	-	-	-
	Spatial occupancy of power plants and related facilities	x	x	x	x	X	-	-	-
IV Decom	Procurement of construction materials and securing water supply	x	х	x	x	X	х	х	x

 Table 9.4-3
 (1) Assumed Activities due to Generation Development Plans

missioni ng	Earth moving work such as excavation, cutting and mounting	х	х	х	x	х	х	х	х	
Stage	Construction work for power plant and related facilities	х	х	х	х	х	х	х	х	
	Operation of construction machines, vehicles and plants etc.	х	х	х	х	х	х	х	х	

Note 1 : * Hydropower – Pumped Storage Hydropower (Sea water) Note 2: {x} indicates some relation. Source: JICA Study Team

(1) Thermal Power (Natural gas/LNG)

 Table 9.4.3
 (2) Matrix Expression of Negative Impacts

Environmental item *, **		Ratin	ıg ***,	****	
Environmental item ", ""	Т	Ι	Π	Ш	IV
(1) Social Environment					
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В
2) Local economy such as employment and livelihood etc.	С	С	С	C	С
3) Energy use	В	В	В	В	С
4) Water use	A/B	A/B	A/B	A/B	С
5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С
6) Social institutions such as social infrastructure and local	С	С	С	С	С
decision-making institutions, a split of communities					
7) Existing social infrastructures and services	С	С	С	С	С
8) The poor, indigenous of ethnic people	С	С	С	C	С
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	C	С	С	С	С
10) Local conflict of interests	C	С	С	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	C	С	С	С	С
13) Public health and Sanitation	B/C	D	В	В	С
14) Infectious diseases such as HIV/AIDS	C	D	С	С	С
15) Working condition including occupational safety	C	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В

17) Accidents	A/B	D	В	A/B	В
(2) Natural Environment					
18) Topography and Geology	С	D	С	С	C
19) Soil erosion/sand movement	С	D	С	С	С
20) Movement of water/Hydrological situation	С	D	С	С	C
21) Coastal zone	В	D	В	В	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	C
25) Micro-climate	С	D	С	С	С
26) Global Warming	A/B	D	В	A/B	В
(3) Environmental Pollution					
27) Air pollution	A/B	D	В	A/B	В
28) Water pollution	A/B	D	В	A/B	В
29) Soil contamination	В	D	В	В	В
30) Bottom sediment	В	D	В	В	С
31) Soild waste	В	D	В	В	В
32) Noise and Vibration	В	D	В	В	C
33) Ground Subsidence	С	D	C	С	С
34) Offensive odor	С	D	C	С	С
35) Sunshine inhibition/Reflection of sunlight	С	D	C	C	С
36) Electromagnetic interference	С	D	C	C	С
37) Safety from Electromagnetic Field	С	D	C	C	С
(4) Permit, Explanation and Others					
Subject	С				

Table 9.4.3 (3) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation Measures

Environmental item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
(1) Social Enviro	onment		I	
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	(T) To secure the lands/spaces for planned thermal power plants and related facilities, there is a possibility of involuntary resettlement including land acquisition and resettlement as well as wayleaves, generation of Project Affected Persons (PAPs), although it depends on the details of the plan (site location/route, scale, components etc.).	(T) 1) Laws and regulations for involuntary resettlement (land acquisition and resettlement) and easement/wayleaves . 2) Land use regulation and existing land use in Jordan and planned area. 3) Cases and causes of involuntary resettlement in Jordan and planned area. 4) Anticipated land area and location for the site to be secured by the plan.	 (T) 1) Consider alternative plans to avoid and/or minimize the occurrence of involuntary resettlement. 2) Detailed inventory survey on plots, facilities, structures and peoples living along the planned railway routes. 3) Survey on encroachment on ROW (Right Of Way) of the planned site/alignment. 4) Examine procedure and condition of involuntary resettlement and compensation to PAPs taking relevant laws in Jordan and the JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement is unavoidable.
3) Energy use	В	(I, III) To procure natural gas/LNG for fuel by uploading and transportation, there is a possibility to generate	(I, III) Procurement plan of natural gas/LNG as fuel source.	(I, III) 1) Consider preventive measures for leakage of natural gas/LNG during uploading/transportation. 2) Consider preventive

		negative impact on environment. However, extent of impact depends on the plan of power plants and related facilities.		measuresfor exhaust emission from trucks.
4) Water use	A/B	(T) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, to secure water supply for use such as processing, cooling, sprinkling etc. of power plants and related facilities, it is expected to face severe competence with other water supply.	(T) 1) Laws and regulations for water use and water extraction form water resources. 2) Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor water consumption in the plan.
5) Land use and utilization of local resources	A/B	 (V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities. 	 (T) 1) Laws and regulation for use of land and resources. 2) Existing and future land and resources use in Jordan and planned area. 	(T) Consider appropriate and effective utilization of land and resources in the plan.
6) Social institutions such as social infrastructure and local decision-makin g institutions, a split of communities	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power	(T) Information of administrative and social structures and decision-making process and institutions in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered for stakeholders including decision-makers of the communities from early stage of planning for obtaining thorough understanding and consensus of the people and

		plants and related facilities. However, there is a possibility of missing acceptance by the communities, if the plan is not properly informed to relevant stakeholders including community based organizations for participating.		communities by promoting that the plan may contribute to improvement of local economy and upgrading living conditions.
11) Cultural property and heritage	В	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
13) Public health and Sanitation	B/C	(II, III, IV) There is a possibility of deterioration respiratory functions due to inhalation of air pollutants such as NOx and PM2.5, if control of pollutants emission in construction and decommissioning work and operation of power plants and related facilities is not conducted appropriately.	(II, III, IV) 1) Laws and regulations of public health and sanitation. 2) Public health condition including respiratory disease and distribution of medical facilities in Jordan and planned area.	(T) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor public health condition by medical examination.
16) Hazard/risk (disaster, security)	В	(T) No additional risk of disaster and public security are expected due to installation of power	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for

		plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict.	planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	hazard and public security risks.
17) Accidents	A/B	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natural Envi	ronment			
21) Coastal zone	В	(II, III, IV) There is a possibility that change in oceanographic conditions and coastal erosion/sedimentation due to development of coastal area for landing work of fuels and other materials at port and/or water storage by pumping up at hydropower plant. However, extent of impact is unknown at present.	(II, III, IV) 1) Regulation of development and environmental conservation in coastal area. 2) Existing environmental condition of coastal area.	(II, III, IV) 1) Appropriate preventive measures against coastal erosion, and sedimentation of sand and soil in the plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand by physical observation and utilizing satellite image map.
22) Environmentall y sensitive areas (Protected	В	(II, III, IV) In Jordan designated Protected Areas and Important Bird and Biodiversity	(II, III, IV) 1) Distribution of designated Protected Areas,	(II, III, IV) To avoid site location within or close to the designated Protected Areas and

Areas, IBAs etc.)		Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	parks.
23) Flora, Fauna, Ecosystem and Biodiversity	В	(II, III, IV) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally sensitive areas.
24) Landscape	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a possibility of deterioration aesthetic value of landscape by spatial occupancy of power plants and related facilities.	(III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable landscape.	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by design and tree planting in the plan.
26) Global Warming	A/B	(II, III, IV) Emission of greenhouse gases (GHG) such as CO ₂ , CH ₄ , which may affect consequently global warming and climate change is	(II, III, IV) 1) Existing data of greenhouse gases emission in Jordan and planned area. 2) Anticipated	(II, III, IV) Preventive measures to reduce greenhouse gases emission in construction and decommissioning work and in operation of power plants and related facilities.

		expected from construction vehicles and machines during construction and decommissioning stage, and from power plants and related facilities during operation stage. However, extent of emission and kind of greenhouse gases depend on specifications and features of power plants and related facilities.	greenhouse gases emission from power plants and related facilities.	
(3) Environment	al Pollutio)n		
27) Air pollution	A/B	(II, III, IV) Generation of air pollutants such as dust, PM10, PM2.5, SOx, NOx are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related facilities. 	(II, III, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	A/B	(II, III, IV) Generation of water pollutants such as SS, BOD, COD, oil & grease, and other organic and inorganic substances as well as thermal effluent, are expected due	 (II, III, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan 	(II, III, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor

		to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	and planned area. 3) Anticipated discharge of water pollutants from power plants and related facilities.	water pollutants discharge and environmental water quality.
29) Soil contamination	В	(II, III, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work, and from operation of power plant and related facilities. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, III, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor soil contamination.
30) Bottom sediment	В	(II, III, IV) There is a possibility of bottom sediment contamination due to leakage of fuels and other materials during landing work at the port. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, III, IV) Monitoring bottom sediment contamination.
31) Soild waste	В	(II, III, IV) Generation of solid wastes is expected from are expected due to	(II, III, IV) 1) Regulation for solid waste management.	(II, III, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid

32) Noise and	В	earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities such as fly ash during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities. (II, III, IV) Generation of	2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work. 4) Anticipated solid waste generation including fly ash from power plants and related facilities. (II, III, IV) 1)	<pre>waste during construction/decommissioning stage and operation stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.</pre>
Vibration	D	 (ii, iii, iv) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities. 	(II, III, IV) I) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3) Anticipated generation of noise and vibration from power plants and related facilities.	against generation of noise and vibration during operation of power plants and related facilities as well as during construction and decommissioning work.
(4) Permit, Expla	c	d Others	(T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3)	 (T) Comparison of Alternative Plans. 2) Environmental Management Plan, Environmental Monitoring Plan, Emergency Action Plan etc.

	Information	
	disclosure. 4)	
	Stakeholder	
	participation. 5)	
	International	
	Treaties,	
	Agreements,	
	Convention.	

(2) Thermal power plant – Oil fired (Heavy fuel oil/diesel)

 Table 9.4.3
 (4) Matrix Expression of Negative Impacts

Environmental item *, **	Rating ***, ****					
Environmental tem ,	Т	Ι	п	ш	IV	
(1) Social Environment	1	I	1	I		
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В	
2) Local economy such as employment and livelihood etc.	С	С	С	С	С	
3) Energy use	В	В	В	В	С	
4) Water use	A/B	A/B	A/B	A/B	С	
5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С	
6) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	С	С	С	С	С	
7) Existing social infrastructures and services	С	С	С	С	С	
8) The poor, indigenous of ethnic people	С	С	С	С	С	
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	С	С	С	С	
10) Local conflict of interests	С	С	С	С	С	
11) Cultural property and heritage	В	D	В	С	С	
12) Fishing rights, water rights and rights of common	C	С	С	С	С	
13) Public health and Sanitation	B/C	D	В	B/C	С	

14) Infectious diseases such as HIV/AIDS	С	D	С	С	С
15) Working condition including occupational safety	С	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	A/B	D	В	A/B	В
(2) Natural Environment				1	
18) Topography and Geology	С	D	C	С	С
19) Soil erosion/sand movement	С	D	С	С	С
20) Movement of water/Hydrological situation	С	D	С	С	С
21) Coastal zone	В	D	В	В	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	С	D	C	С	С
26) Global Warming	A/B	D	В	A/B	В
(3) Environmental Pollution			1		
27) Air pollution	A/B	D	В	A/B	С
28) Water pollution	A/B	D	В	A/B	С
29) Soil contamination	В	D	В	В	С
30) Bottom sediment	В	D	В	В	С
31) Soild waste	A/B	D	В	A/B	В
32) Noise and Vibration	В	D	В	В	С
33) Ground Subsidence	С	D	С	С	С
34) Offensive odor	С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight	С	D	С	С	С
36) Electromagnetic interference	С	D	С	С	С
37) Safety from Electromagnetic Field	С	D	С	С	С

(4) Permit, Explanation and Others					
Subject	С				
		Source:	JICA	Study T	eam

 Table 9.4.3 (5) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation

 Measures

Environmen	Rating		E. d Name	Descilit Militaria
tal item	***,	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
* **	****			
(1) Social Env	ironment			
1) Land	A/B	(T) To secure the	(T) 1) Laws and	(T) 1) Consider alternative
acquisition		lands/spaces for	regulations for	plans to avoid and/or
and		planned power plants	involuntary resettlement	minimize the occurrence of
resettlement		and related facilities,	(land acquisition and	involuntary resettlement. 2)
(Involuntary		there is a possibility of	resettlement) and	Detailed inventory survey on
resettlement)		involuntary	easement/wayleaves. 2)	plots, facilities, structures
		resettlement including	Land use regulation and	and peoples living along the
		land acquisition and	existing land use in	planned railway routes. 3)
		resettlement as well as	Jordan and planned area.	Survey on encroachment on
		wayleaves, generation	3) Cases and causes of	ROW (Right Of Way) of the
		of Project Affected	involuntary resettlement	planned site/alignment. 4)
		Persons (PAPs),	in Jordan and planned	Examine procedure and
		although it depends on	area. 4) Anticipated land	condition of involuntary
		the details of the plan	area and location for the	resettlement and
		(site location/route,	site to be secured by the	compensation to PAPs
		scale, components etc.).	plan.	taking relevant laws in
				Jordan and the JICA
				Guidelines into
				considerations. 5) From
				early stage of the project,
				pay attention to information
				disclosure and consultation
				with stakeholders including
				PAPs for thorough
				understanding of the issues
				or to make agreement as
				much as possible. 6)
				Elaborate Resettlement

				Action Plan (RAP), if involuntary resettlement is unavoidable.
3) Energy use	В	(I, III) To procure heavy oil/diesel oil for fuel by uploading and transportation, there is a possibility to generate negative impact on environment. However, extent of impact depends on the plan of power plants and related facilities.	(I, III) Procurement plan of heavy oil/diesel oil as fuel source.	(I, III) 1) Consider preventive measures for leakage of heavy oil/diesel oil during uploading/transportation. 2) Consider preventive measures for exhaust emission from trucks.
4) Water use	A/B	(T) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, to secure water supply for use such as processing, cooling, sprinkling etc. of power plants and related facilities, it is expected to face severe competence with other water supply.	(T) 1) Laws and regulations for water use and water extraction form water resources. 2) Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor water consumption in the plan.
5) Land use and utilization of local resources	A/B	 (V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities. 	(T) 1) Laws and regulation for use of land and resources. 2) Existing and future land and resources use in Jordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.

11) Cultural property and heritage	B	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
16) Hazard/risk (disaster, security)	В	(T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict.	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accidents	A/B	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natural E	nvironmei	ıt	1	1
21) Coastal	В	(II, III, IV) There is a possibility that change	(II, III, IV) 1) Regulation of development and	(II, III, IV) 1) Appropriate preventive measures against

zone		in oceanographic conditions and coastal erosion/sedimentation due to development of coastal area for landing work of fuels and other materials at port and/or water storage by pumping up at hydropower plant. However, extent of impact is unknown at present.	environmental conservation in coastal area. 2) Existing environmental condition of coastal area.	coastal erosion, and sedimentation of sand and soil in the plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand by physical observation and utilizing satellite image map.
22) Environment ally sensitive areas (Protected Areas, IBAs etc.)	B	(II, III, IV) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.
23) Flora, Fauna, Ecosystem and Biodiversity	В	(II, III, IV) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally sensitive areas.

24) Landscape	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a possibility of deterioration aesthetic value of landscape by spatial occupancy of power plants and related facilities.	(III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable landscape.	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by design and tree planting in the plan.
26) Global	A/B	(II, III, IV) Emission of	(II, III, IV) 1) Existing	(II, III, IV) Preventive
Warming		greenhouse gases (GHG) such as CO ₂ , CH ₄ , which may affect consequently global warming and climate change is expected from construction vehicles and machines during construction and decommissioning stage, and from power plants and related facilities during operation stage. However, extent of emission and kind of greenhouse gases depend on specifications and features of power plants and related facilities.	data of greenhouse gases emission in Jordan and planned area. 2) Anticipated greenhouse gases emission from power plants and related facilities.	measures to reduce greenhouse gases emission in construction and decommissioning work and in operation of power plants and related facilities.
(3) Environme	ental Pollu	ition		
27) Air pollution	A/B	(II, III, IV) Generation of air pollutants such as dust, PM10, PM2.5, SOx, NOx are expected due to earth moving	(II, III, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and	(II, III, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and

		and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	planned area. 3) Anticipated emission of air pollutants from power plants and related facilities.	in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	A/B	(II, III, IV) Generation of water pollutants such as SS, BOD, COD, oil & grease, and other organic and inorganic substances as well as thermal effluent, are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of water pollutants from power plants and related facilities. 	(II, III, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor water pollutants discharge and environmental water quality.
29) Soil contaminatio n	В	(II, III, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work,	(II, III, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, III, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work and in operation of power plants and related facilities. 2)

		and from operation of power plant and related facilities. However, features of the contamination is unknown at present.		Monitor soil contamination.
30) Bottom sediment	В	(II, III, IV) There is a possibility of bottom sediment contamination due to leakage of fuels and other materials during landing work at the port. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, III, IV) Monitoring bottom sediment contamination.
31) Solid waste	A/B	(II, III, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities such as fly ash during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work. 4) Anticipated solid waste generation including fly ash from power plants and related facilities. 	(II, III, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioni ng stage and operation stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, III, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works	(II, III, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3)	(II, III, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during construction and

		during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities.	Anticipated generation of noise and vibration from power plants and related facilities.	decommissioning work.
(4) Permit, Ex	planation	and Others		
Subject	С		 (T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3) Information disclosure. 4) Stakeholder participation. 5) International Treaties, Agreements, Convention. 	 (T) Comparison of Alternative Plans. 2) Environmental Management Plan, Environmental Monitoring Plan, Emergency Action Plan etc.

(3) Thermal power – Coal Fired

 Table 9.4.3
 (6) Matrix Expression of Negative Impacts

Environmental item *, **	Rating ***, ****						
Environmental tem ,	Т	Ι	Π	Ш	IV		
(1) Social Environment							
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В		
2) Local economy such as employment and livelihood etc.	С	С	С	С	С		
3) Energy use	В	В	В	В	С		
4) Water use	A/B	A/B	A/B	A/B	С		
5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С		
6) Social institutions such as social infrastructure and local	С	С	С	С	С		

decision-making institutions, a split of communities					
7) Existing social infrastructures and services	С	С	С	С	С
8) The poor, indigenous of ethnic people	С	С	С	С	С
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	С	С	С	С
10) Local conflict of interests	С	С	C	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	С	С	С	С	С
13) Public health and Sanitation	B/C	D	В	B/C	С
14) Infectious diseases such as HIV/AIDS	С	D	С	С	С
15) Working condition including occupational safety	С	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	A/B	D	В	A/B	В
(2) Natural Environment					
18) Topography and Geology	С	D	С	С	С
19) Soil erosion/sand movement	С	D	С	С	С
20) Movement of water/Hydrological situation	С	D	С	С	С
21) Coastal zone	В	D	В	В	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	С	D	C	С	С
26) Global Warming	A/B	D	В	A/B	В
(3) Environmental Pollution		<u> </u>	1	<u>I</u>	<u> </u>
27) Air pollution	A/B	D	В	A/B	С
28) Water pollution	A/B	D	В	A/B	С
29) Soil contamination	В	D	В	В	С

30) Bottom sediment	В	D	В	В	С
31) Soild waste	A/B	D	В	A/B	В
32) Noise and Vibration	В	D	В	В	С
33) Ground Subsidence	С	D	С	С	С
34) Offensive odor	С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight	С	D	С	С	С
36) Electromagnetic interference	С	D	С	С	С
37) Safety from Electromagnetic Field	C	D	С	С	С
(4) Permit, Explanation and Others	1			1	
Subject	С				

Table 9.4.3 (7) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation Measures

Environm ental item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
(1) Social E	nvironme	ent		
1) Land	A/B	(T) To secure the lands/spaces	(T) 1) Laws and	(T) 1) Consider alternative
acquisitio		for planned power plants and	regulations for	plans to avoid and/or
n and		related facilities, there is a	involuntary resettlement	minimize the occurrence of
resettleme		possibility of involuntary	(land acquisition and	involuntary resettlement. 2)
nt		resettlement including land	resettlement) and	Detailed inventory survey
(Involunta		acquisition and resettlement	easement/wayleaves. 2)	on plots, facilities,
ry		as well as wayleaves,	Land use regulation and	structures and peoples living
resettleme		generation of Project Affected	existing land use in	along the planned railway
nt)		Persons (PAPs), although it	Jordan and planned area.	routes. 3) Survey on
		depends on the details of the	3) Cases and causes of	encroachment on ROW
		plan (site location/route,	involuntary resettlement	(Right Of Way) of the
		scale, components etc.).	in Jordan and planned	planned site/alignment. 4)
			area. 4) Anticipated land	Examine procedure and
			area and location for the	condition of involuntary
			site to be secured by the	resettlement and
			plan.	compensation to PAPs
				taking relevant laws in

				Jordan and the JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
2) Local economy such as employme nt and livelihood etc.	С	 (T) Beneficial impacts are expected on local economy; (i) creation of employment opportunity for civil work during construction and decommissioning stage, (ii) new power generation may improve living condition. However, extent of impact is unknown at present. 	(T) 1) Development PPPs of Jordan and other sectors (tourism, industry, mining, regional development etc.) 2) Labor force and employment and working needs in planned area.	(T) 1) Promote consistency and synergy with other development plans (PPPs) by whole country and other sectors.
3) Energy use	В	(I, III) To procure coal by uploading and transportation, there is a possibility to generate negative impact on environment. However, extent of impact depends on the plan of power plants and related facilities.	(I, III) Procurement plan of coal as fuel source.	(I, III) 1) Consider preventive measures for leakage of coal during uploading/transportation. 2) Consider preventive measuresfor exhaust emission from trucks.
4) Water use	A/B	(T) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, to secure water supply	(T) 1) Laws andregulations for water useand water extractionform water resources. 2)Water demand andsupply in Jordan and	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor

		for use such as processing, cooling, sprinkling etc. of power plants and related facilities, it is expected to face severe competence with other water supply.	planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	water consumption in the plan.
5) Land use and utilization of local resources	A/B	(V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities.	(T) 1) Laws andregulation for use of landand resources. 2)Existing and future landand resources use inJordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.
6) Social institution s such as social infrastruct ure and local decision- making institution s, a split of communiti es	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of missing acceptance by the communities, if the plan is not properly informed to relevant stakeholders including community based organizations for participating.	(T) Information of administrative and social structures and decision-making process and institutions in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered for stakeholders including decision-makers of the communities from early stage of planning for obtaining thorough understanding and consensus of the people and communities by promoting that the plan may contribute to improvement of local economy and upgrading living conditions.
7) Existing social infrastruct ures and services	С	(T) There is a possibility of missing acceptance by the communities and causing split of community, if the plan is not properly informed to relevant stakeholders including community based organizations for	(T) 1) Laws and regulations for social infrastructures and services. 2) Existing situation of social infrastructures and services in Jordan and planned area.	(T) 1) Avoid or minimize disturbance existing social infrastructures and services in the plan. 2) Promote synergy with plans for other social infrastructure and services.

		participation.		
8) The poor, indigenou s of ethnic people	С	 (T) Power plants and related facilities is expected to contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity. However, it is unknown whether the poor and vulnerables are able to enjoy the benefit equally or not at present. 	(T) 1) Data of vulnerable groups such as the poor, female, children, elders, disabled, refugees and indigenous ethnic people in Jordan and planned area. 2) Supporting activities to living and livelihood condition by Jordan Government and donors.	(T) 1) Give higher priority to the vulnerable groups in the planned area with having a chance to get jobs and training to get working skills in the plan. 2) The vulnerable people should be taken fully considerations to compensate properly or support to restore the present living condition in case of involuntary resettlement, even if they are illegal occupants.
9) Misdistrib ution of benefit and damage (Equality of benefits and losses and equality involved in developm ent process)	C	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of misdistribution of benefit and damage, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public participation.	(T) Cases and causes of misdistribution of benefit and damage by the development plans of electric sector and others in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered from early stage to obtain thorough understanding the plan and consensus among the communities and PAPs in order to share with benefit and damage equally.
10) Local conflict of interests	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and	(T) Cases and causes of local conflict of interests by the development plans of electric sector and	(T) Information disclosure and public participation should be fully considered from early stage to obtain

		decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of generation of local conflict, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public participation.	others in Jordan and planned area.	thorough understanding the plan and consensus among the communities and PAPs in order to avoid or minimize local conflict of interests.
11) Cultural property and heritage	В	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
12) Fishing rights, water rights and rights of common	С	(T) There is a possibility of disturbing fishing rights, water rights and rights of common depending on the project plan. However, extent of impact is unknown at present.	(T) Situation of fishing rights, water rights and rights of common in Jordan and planned area.	(T) Promote participation of those who have the rights in order to get their opinion and ensuring understanding and making consent in the course of the stakeholder meeting from the planning stage
13) Public health and Sanitation	B/C	(II, III, IV) There is a possibility of deterioration respiratory functions due to inhalation of air pollutants such as NOx and PM2.5, if control of pollutants emission	(II, III, IV) 1) Laws and regulations of public health and sanitation. 2)Public health condition including respiratory disease and distribution	(T) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2)

		in construction and decommissioning work and operation of power plants and related facilities is not conducted appropriately.	of medical facilities in Jordan and planned area.	Monitor public health condition by medical examination.
14) Infectious diseases such as HIV/AID S	C	(II, IV) In many developing countries spreading of infectious diseases such as HIV/AIDS were often reported due to contact of workers with affected peoples at their camp in construction work. Thus, it is expected somewhat spreading of infectious diseases during construction and decommissioning stage. However, extent of impact is unknown at present.	(II, IV) 1) Regulations for infectious diseases. 2) Cases and causes of infectious diseases such as HIV/AIDS in Jordan and planned area.	(II, IV) 1) Enlightenment and education of infectious diseases to people and workers. 2) Monitoring prevalence and safety shoes and hats. (3) Regular check of occupational safety and health condition.
15) Working condition including occupatio nal safety	C	(II, III, IV) Adverse impacts on working condition including occupational safety are expected somewhat due to insufficient management of workers at construction and decommissioning work, and at operation of power plants and related facilities. However, extent of impact is unknown at present.	 (II, III, IV) 1) Regulation for labor and occupational health and safety. 2) Cases and causes of working condition issues including occupational health and safety in Jordan and planned area. 3) Management plan for working condition in construction and decommissioning work, and in operation of power plants and related facilities. 	(II, III, IV) 1) Prepare tangible safety considerations in place for individuals involved in the plan, such as the installation of safety equipment which prevents accidents, and management of hazardous materials. 2) Plan and implement intangible measures for individuals involved in the plan, such as the establishment of a safety and health program, and safety training for workers etc. 3) Monitoring occupational health and safety condition.

16) Hazard/ris k (disaster, security)	В	 (T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict. 	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accidents	A/B	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natural	Environ	nent		
21) Coastal zone	В	(II, III, IV) There is a possibility that change in oceanographic conditions and coastal erosion/sedimentation due to development of coastal area for landing work of fuels and other materials at port and/or water storage by pumping up at hydropower plant. However, extent of impact is unknown at present.	(II, III, IV) 1) Regulation of development and environmental conservation in coastal area. 2) Existing environmental condition of coastal area.	(II, III, IV) 1) Appropriate preventive measures against coastal erosion, and sedimentation of sand and soil in the plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand by physical observation and utilizing satellite image map.
22) Environm entally sensitive areas (Protected	В	(II, III, IV) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus,	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.

Areas, adverse impact on them is plan	nned area. 2)
	gulations for
	servation of natural
1	ironment.
area.	
23) Flora, B (II, III, IV) In Jordan there are (II,	III, IV) 1) (II, III, IV) To avoid site
Fauna, found many precious plant Dist	tribution of site with location within or close to
Ecosystem and animal species as well as value	able plant and animal distribution areas of
and important areas of valuable spec	cies, ecosystem and valuable plant and animal
Biodiversi ecosystem and biodiversity. biod	liversity in Jordan species, and
ty Thus, adverse impact on them and	the planned area. 2) environmentally sensitive
is expected, if the site of Reg	ulations for areas.
power plants and related con	servation of plant,
facilities is located within or anim	nal species and
close to the area. biod	liversity.
24) B (III) In Jordan cultural and (III)) 1) Distribution of (III) 1) To avoid site
	with valuable location close to existing
	discape in Jordan and important landscape. 2)
	planned area. 2) Measures to harmonize
	gulation for preserving power plants and related
	able landscape. facilities with surrounding
aesthetic value of landscape	landscape by design and tree
by spatial occupancy of	planting in the plan.
power plants and related	planting in the plant
facilities.	
26) Global A/B (II, III, IV) Emission of (II,	III, IV) 1) Existing (II, III, IV) Preventive
Warming greenhouse gases (GHG) such data	a of greenhouse gases measures to reduce
as CO ₂ , CH ₄ , which may emi	ssion in Jordan and greenhouse gases emission
affect consequently global plan	in construction and
warming and climate change Ant	icipated greenhouse decommissioning work and
is expected from construction gase	es emission from in operation of power plants
vehicles and machines during pow	ver plants and related and related facilities.
construction and faci	lities.
decommissioning stage, and	
from power plants and related	
facilities during operation	
stage. However, extent of	
emission and kind of	
greenhouse gases depend on	

(3) Environ	mental P	specifications and features of power plants and related facilities. ollution		
27) Air pollution	A/B	(II, III, IV) Generation of air pollutants such as dust, PM10, PM2.5, SOx, NOx are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	(II, III, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related facilities.	(II, III, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	A/B	(II, III, IV) Generation of water pollutants such as SS, BOD, COD, oil & grease, and other organic and inorganic substances as well as thermal effluent, are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of water pollutants from power plants and related facilities. 	(II, III, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor water pollutants discharge and environmental water quality.

29) Soil contamina tion	В	(II, III, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work, and from operation of power plant and related facilities. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, III, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor soil contamination.
30) Bottom sediment	В	(II, III, IV) There is a possibility of bottom sediment contamination due to leakage of fuels and other materials during landing work at the port. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, III, IV) Monitoring bottom sediment contamination.
31) Soild waste	A/B	(II, III, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities such as fly ash during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work. 4) Anticipated solid waste generation including fly ash from power plants and related facilities. 	(II, III, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioni ng stage and operation stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, III, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during	(II, III, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and	(II, III, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities

		construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation depends on specifications and features of power plants and related	planned area. 3) Anticipated generation of noise and vibration from power plants and related facilities.	as well as during construction and decommissioning work.
		facilities.		
(4) Permit	, Explanat	tion and Others		
Subject	С		(T) 1) Methodology of	(T) Comparison of
			Environmental Impact	Alternative Plans. 2)
			Assessment in Jordan. 2)	Environmental Management
			Items and Procedures for	Plan, Environmental
			Permit/Approval. 3)	Monitoring Plan,
			Information disclosure.	Emergency Action Plan etc.
			4) Stakeholder	
			participation. 5)	
			International Treaties,	
			Agreements, Convention.	

(4) Thermal Power –Oil Shale Burning

Table 0 / 3	(8) Matrix Expression of Negative Impacts
14010 9.4.5	(6) Matrix Expression of Negative impacts

Environmental item *, **	Rating ***, ****					
(1) Social Environment	Т	Ι	Π	Ш	IV	
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В	
2) Local economy such as employment and livelihood etc.	C	С	С	С	С	
3) Energy use	В	D	С	В	С	
4) Water use	A/B	A/B	A/B	A/B	С	
5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С	
6) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	C	С	С	С	С	

7) Existing social infrastructures and services	C	С	С	С	С
8) The poor, indigenous of ethnic people	C	С	С	С	С
9) Misdistribution of benefit and damage (Equality of benefits	C	С	C	С	С
and losses and equality involved in development process)					
10) Local conflict of interests	С	С	С	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	C	С	С	С	С
13) Public health and Sanitation	B/C	D	В	B/C	С
14) Infectious diseases such as HIV/AIDS	C	D	С	С	С
15) Working condition including occupational safety	C	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	A/B	D	В	A/B	В
(2) Natural Environment					
18) Topography and Geology	С	D	С	С	С
19) Soil erosion/sand movement	C	D	С	С	С
20) Movement of water/Hydrological situation	C	D	С	С	С
21) Coastal zone	С	D	С	С	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	C	D	C	С	С
26) Global Warming	A/B	D	В	A/B	В
(3) Environmental Pollution					
27) Air pollution	A/B	D	В	A/B	С
28) Water pollution	A/B	D	В	A/B	С
29) Soil contamination	В	D	В	В	С
30) Bottom sediment	C	D	С	С	С

31) Soild waste	A/B	D	В	A/B	В
32) Noise and Vibration	В	D	В	В	С
33) Ground Subsidence	С	D	С	С	С
34) Offensive odor	С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight	C	D	С	С	С
36) Electromagnetic interference	С	D	С	С	С
37) Safety from Electromagnetic Field	С	D	С	С	С
(4) Permit, Explanation and Others					
Subject	С				

Table 9.4.3	(9) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation
	Measures

Environmen tal item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
(1) Social Env	ironment			
1) Land	A/B	(T) To secure the	(T) 1) Laws and	(T) 1) Consider alternative
acquisition		lands/spaces for planned	regulations for	plans to avoid and/or
and		thermal power plant by	involuntary resettlement	minimize the occurrence of
resettlement		burning oil shale and	(land acquisition and	involuntary resettlement. 2)
(Involuntary		related facilities, there is a	resettlement) and	Detailed inventory survey on
resettlement)		possibility of involuntary	easement/wayleaves. 2)	plots, facilities, structures
		resettlement including land	Land use regulation and	and peoples living along the
		acquisition and	existing land use in	planned railway routes. 3)
		resettlement as well as	Jordan and planned area.	Survey on encroachment on
		wayleaves, generation of	3) Cases and causes of	ROW (Right Of Way) of the
		Project Affected Persons	involuntary resettlement	planned site/alignment. 4)
		(PAPs), although it	in Jordan and planned	Examine procedure and
		depends on the details of	area. 4) Anticipated land	condition of involuntary
		the plan (site	area and location for the	resettlement and
		location/route, scale,	site to be secured by the	compensation to PAPs
		components etc.).	plan.	taking relevant laws in
				Jordan and the JICA

				Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
3) Energy use	В	(T) To procure oil shale by exploitation, storage and/or transportation, there is a possibility to generate hazardous materials from oil shake mining and exhaust gas emission from truck. However, extent of impact depends on the plan of the power plants and related facilities.	(III) Procurement plan of oil shale.	(III) 1) Consider preventive measures for mining pollution due to exploitation of oil shale. 2) Consider preventive measures for exhaust emission from trucks.
4) Water use	A/B	(T) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, to secure water supply for use such as processing, cooling, sprinkling etc. of power plants and related facilities, it is expected to face severe competence with other water supply.	(T) 1) Laws and regulations for water use and water extraction form water resources. 2) Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor water consumption in the plan.

5) Land use and utilization of local resources	A/B	 (V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities. 	(T) 1) Laws andregulation for use of landand resources. 2)Existing and future landand resources use inJordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.
11) Cultural property and heritage	В	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
16) Hazard/risk (disaster, security)	В	 (T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict. 	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accidents	A/B	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.

		and related facilities are carried out.		
(2) Natural En	vironmer	nt	I	I
22) Environment ally sensitive areas (Protected Areas, IBAs etc.)	В	(II, III, IV) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.
23) Flora, Fauna, Ecosystem and Biodiversity	В	(II, III, IV) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally sensitive areas.
24) Landscape	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a possibility of deterioration aesthetic value of landscape by spatial occupancy of power plants and related facilities.	(III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable landscape.	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by design and tree planting in the plan.

100 01 1 1	1.00			
26) Global	A/B	(II, III, IV) Emission of	(II, III, IV) 1) Existing	(II, III, IV) Preventive
Warming		greenhouse gases (GHG)	data of greenhouse gases	measures to reduce
		such as CO ₂ , CH ₄ , which	emission in Jordan and	greenhouse gases emission
		may affect consequently	planned area. 2)	in construction and
		global warming and	Anticipated greenhouse	decommissioning work and
		climate change is expected	gases emission from	in operation of power plants
		from construction vehicles	power plants and related	and related facilities.
		and machines during	facilities.	
		construction and		
		decommissioning stage,		
		and from power plants and		
		related facilities during		
		operation stage. However,		
		extent of emission and kind		
		of greenhouse gases		
		depend on specifications		
		and features of power		
		plants and related facilities.		
(3) Environme	ental Pollu	ition		
27) Air	A/B	(II, III, IV) Generation of	(II, III, IV) 1) Regulation	(II, III, IV) 1) Preventive
pollution		air pollutants such as dust,	of air pollution including	measures to control air
ronanon			air quality and emission	pollutants emission in
Politici		PM10, PM2.5, SOx, NOx	an quanty and chilission	P ····································
ponuton		PM10, PM2.5, SOx, NOx are expected due to earth	standards. 2) Existing air	construction and
ponuton				*
ponution		are expected due to earth	standards. 2) Existing air	construction and
Politikon		are expected due to earth moving and engineering	standards. 2) Existing air quality in Jordan and	construction and decommissioning work and
Politikon		are expected due to earth moving and engineering works during construction	standards. 2) Existing air quality in Jordan and planned area. 3)	construction and decommissioning work and in operation of power plants
ponution		are expected due to earth moving and engineering works during construction and decommissioning	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of	construction and decommissioning work and in operation of power plants and related facilities. 2)
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage.	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air
		are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on	standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from power plants and related	construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor air pollutants emission and ambient air

28) Water pollution	A/B	(II, III, IV) Generation of water pollutants such as SS, BOD, COD, oil & grease, and other organic and inorganic substances as well as thermal effluent, are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation and kind of pollutants depend on specifications and features of power plants and related facilities.	 (II, III, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of water pollutants from power plants and related facilities. 	(II, III, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor water pollutants discharge and environmental water quality.
29) Soil contaminatio n	В	(II, III, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work, and from operation of power plant and related facilities. However, features of the contamination is unknown at present.	(II, III, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, III, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor soil contamination.
31) Soild waste	A/B	(II, III, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and	(II, III, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from	(II, III, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioni ng stage and operation stage in the plan. 2) Reflect

		related facilities such as fly ash during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities.	 construction and decommissioning work. 4) Anticipated solid waste generation including fly ash from power plants and related facilities. 	concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, III, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during construction and decommissioning stage, and from power plant and related facilities during operation stage. However, extent of generation depends on specifications and features of power plants and related facilities.	(II, III, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3) Anticipated generation of noise and vibration from power plants and related facilities.	(II, III, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during construction and decommissioning work.
(4) Permit, Ex	planation	and Others	I	
Subject	С		 (T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3) Information disclosure. 4) Stakeholder participation. 5) International Treaties, Agreements, Convention. 	 (T) Comparison of Alternative Plans. 2) Environmental Management Plan, Environmental Monitoring Plan, Emergency Action Plan etc.

(5) Pumped Storage Hydropower (Sea water)

Environmental item * **	Rating ***, ****					
Environmental item *, **	Т	Ι	II	Ш	IV	
(1) Social Environment	1	1	I	1		
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В	
2) Local economy such as employment and livelihood etc.	С	С	С	С	С	
3) Energy use	В	D	С	В	С	
4) Water use	A/B	A/B	A/B	A/B	С	
5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С	
6) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	C	С	С	С	С	
7) Existing social infrastructures and services	С	С	С	С	С	
8) The poor, indigenous of ethnic people	С	С	С	С	С	
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	С	С	С	С	
10) Local conflict of interests	С	С	С	С	С	
11) Cultural property and heritage	В	D	В	С	С	
12) Fishing rights, water rights and rights of common	С	С	С	С	С	
13) Public health and Sanitation	B/C	D	В	B/C	С	
14) Infectious diseases such as HIV/AIDS	С	D	С	С	С	
15) Working condition including occupational safety	С	D	С	С	С	
16) Hazard/risk (disaster, security)	В	В	В	В	В	
17) Accidents	A/B	D	В	A/B	В	
(2) Natural Environment	I	I	L	I		
18) Topography and Geology	C	D	С	С	С	
19) Soil erosion/sand movement	С	D	С	С	С	
20) Movement of water/Hydrological situation	С	D	С	С	С	

 Table 9.4.3
 (10) Matrix Expression of Negative Impacts

21) Coastal zone	С	D	С	С	С			
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С			
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С			
24) Landscape	В	D	В	В	С			
25) Micro-climate	С	D	С	С	С			
26) Global Warming	A/B	D	В	A/B	В			
(3) Environmental Pollution			I	1				
27) Air pollution	A/B	D	В	A/B	С			
28) Water pollution	A/B	D	В	A/B	С			
29) Soil contamination	В	D	В	В	С			
30) Bottom sediment	С	D	С	С	С			
31) Soild waste	A/B	D	В	A/B	В			
32) Noise and Vibration	В	D	В	В	С			
33) Ground Subsidence	С	D	С	С	С			
34) Offensive odor	С	D	С	С	С			
35) Sunshine inhibition/Reflection of sunlight	С	D	С	С	С			
36) Electromagnetic interference	C	D	С	С	С			
37) Safety from Electromagnetic Field	C	D	С	С	С			
(4) Permit, Explanation and Others								
Subject	C							

Environmen tal item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures				
(1) Social Envi	(1) Social Environment							
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	(T) To secure the lands/spaces for planned power plants and related facilities, there is a possibility of involuntary resettlement including land acquisition and resettlement as well as wayleaves, generation of Project Affected Persons (PAPs), although it depends on the details of the plan (site location/route, scale, components etc.).	(T) 1) Laws and regulations for involuntary resettlement (land acquisition and resettlement) and easement/wayleaves. 2) Land use regulation and existing land use in Jordan and planned area. 3) Cases and causes of involuntary resettlement in Jordan and planned area. 4) Anticipated land area and location for the site to be secured by the plan.	(T) 1) Consider alternative plans to avoid and/or minimize the occurrence of involuntary resettlement. 2) Detailed inventory survey on plots, facilities, structures and peoples living along the planned railway routes. 3) Survey on encroachment on ROW (Right Of Way) of the planned site/alignment. 4) Examine procedure and condition of involuntary resettlement and compensation to PAPs taking relevant laws in Jordan and the JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.				

Table 9.4.3 (11) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation Measures

2) Local economy such as employment and livelihood etc.	С	 (T) Beneficial impacts are expected on local economy; (i) creation of employment opportunity for civil work during construction and decommissioning stage, (ii) new power generation may improve living condition. However, extent of impact is unknown at present. 	(T) 1) Development PPPs of Jordan and other sectors (tourism, industry, mining, regional development etc.) 2) Labor force and employment and working needs in planned area.	(T) 1) Promote consistency and synergy with other development plans (PPPs) by whole country and other sectors.
3) Energy use	С	(I, III) To procure supplementary power source.	(I, III) Procurement plan of supplementary power source.	Not required.
4) Water use	В	(T) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, to secure water supply for use such as processing, cooling, sprinkling etc. of power plants and related facilities, it is expected to face severe competence with other water supply.	(T) 1) Laws and regulations for water use and water extraction form water resources. 2) Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor water consumption in the plan.
5) Land use and utilization of local resources	A/B	 (V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities. 	(T) 1) Laws and regulation for use of land and resources. 2) Existing and future land and resources use in Jordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.

6) Social institutions such as social infrastructure and local decision-mak ing institutions, a split of communities	C	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of missing acceptance by the communities, if the plan is not properly informed to relevant stakeholders including community based organizations for	(T) Information of administrative and social structures and decision-making process and institutions in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered for stakeholders including decision-makers of the communities from early stage of planning for obtaining thorough understanding and consensus of the people and communities by promoting that the plan may contribute to improvement of local economy and upgrading living conditions.
7) Existing social infrastructure s and services	C	participating. (T) There is a possibility of missing acceptance by the communities and causing split of community, if the plan is not properly informed to relevant stakeholders including	(T) 1) Laws and regulations for social infrastructures and services. 2) Existing situation of social infrastructures and services in Jordan and	(T) 1) Avoid or minimize disturbance existing social infrastructures and services in the plan. 2) Promote synergy with plans for other social infrastructure and services.
		community based organizations for participation.	planned area.	
8) The poor, indigenous of ethnic people	С	(T) Power plants and related facilities is expected to contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity. However, it is unknown whether the poor and vulnerables are able to enjoy the benefit equally or	 (T) 1) Data of vulnerable groups such as the poor, female, children, elders, disabled, refugees and indigenous ethnic people in Jordan and planned area. 2) Supporting activities to living and livelihood condition by Jordan Government and 	(T) 1) Give higher priority to the vulnerable groups in the planned area with having a chance to get jobs and training to get working skills in the plan. 2) The vulnerable people should be taken fully considerations to compensate properly or support to restore the present living condition in case of involuntary resettlement,

		not at present.	donors.	even if they are illegal occupants.
9) Misdistributi on of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of misdistribution of benefit and damage, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public participation.	(T) Cases and causes of misdistribution of benefit and damage by the development plans of electric sector and others in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered from early stage to obtain thorough understanding the plan and consensus among the communities and PAPs in order to share with benefit and damage equally.
10) Local conflict of interests	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of generation of local conflict, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public	(T) Cases and causes of local conflict of interests by the development plans of electric sector and others in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered from early stage to obtain thorough understanding the plan and consensus among the communities and PAPs in order to avoid or minimize local conflict of interests.

		participation.		
11) Cultural property and heritage	В	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
12) Fishing rights, water rights and rights of common	С	(T) There is a possibility of disturbing fishing rights, water rights and rights of common depending on the project plan. However, extent of impact is unknown at present.	(T) Situation of fishing rights, water rights and rights of common in Jordan and planned area.	(T) Promote participation of those who have the rights in order to get their opinion and ensuring understanding and making consent in the course of the stakeholder meeting from the planning stage
13) Public health and Sanitation	С	(II, IV) There is a possibility of deterioration respiratory functions due to inhalation of air pollutants such as NOx and PM10, if control of pollutants emission in construction and decommissioning work is not conducted appropriately. However, at present extent of impact is unknown.	(II, III, IV) 1) Laws and regulations of public health and sanitation. 2) Public health condition including respiratory disease and distribution of medical facilities in Jordan and planned area.	(T) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor public health condition by medical examination.
14) Infectious diseases such as HIV/AIDS	С	(II, IV) In many developing countries spreading of infectious diseases such as HIV/AIDS were often reported due to contact of	(II, IV) 1) Regulationsfor infectious diseases.2) Cases and causes ofinfectious diseases suchas HIV/AIDS in Jordan	(II, IV) 1) Enlightenment and education of infectious diseases to people and workers. 2) Monitoring prevalence and safety shoes

		workers with affected peoples at their camp in construction work. Thus, it is expected somewhat spreading of infectious diseases during construction and decommissioning stage. However, extent of impact is unknown at present.	and planned area.	and hats. (3) Regular check of occupational safety and health condition.
15) Working condition including occupational safety	C	(II, III, IV) Adverse impacts on working condition including occupational safety are expected somewhat due to insufficient management of workers at construction and decommissioning work, and at operation of power plants and related facilities. However, extent of impact is unknown at present.	(II, III, IV) 1) Regulation for labor and occupational health and safety. 2) Cases and causes of working condition issues including occupational health and safety in Jordan and planned area. 3) Management plan for working condition in construction and decommissioning work, and in operation of power plants and related facilities.	(II, III, IV) 1) Prepare tangible safety considerations in place for individuals involved in the plan, such as the installation of safety equipment which prevents accidents, and management of hazardous materials. 2) Plan and implement intangible measures for individuals involved in the plan, such as the establishment of a safety and health program, and safety training for workers etc. 3) Monitoring occupational health and safety condition.
16) Hazard/risk (disaster, security)	В	 (T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict. 	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.

17) Accidents	В	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natural En	vironmen	t		
18) Topography and Geology	С	(II, IV) There is a possibility of causing adverse impact, if that a large-scale alteration of topographic and geologic features are included in construction plan of power plants and related facilities. However, extent of impact is unknown at present.	(II, IV) 1) Topographical and geological data in Jordan and planned area. 2) Anticipated amount of construction materials for procurement and removal of soil and stones for land clearance of power plants and related facilities.	(II, IV) 1) To avoid site and route with unstable and easy to collapsing condition. 2) To avoid land with topographical or geological importance.
19) Soil erosion/sand movement	С	(II, IV) There is a possibility of occurrence of soil erosion, if that a large-scale alteration of topographic and geologic features as well as cutting and filling of surface soil are included in construction plan of power plants and related facilities. However, extent of impact is unknown at present.	(II, IV) 1) Regulation for soil erosion and land slide. 2) Cases and causes of soil erosion and land slide in Jordan and planned area.	(II, IV) To avoid site and route with unstable soil condition in the area likely to occurrence of soil erosion and land slide.

20) Movement of water/Hydrol ogical situation	С	(III) There is a possibility that hydrological conditions such as water flow and water level are adversely affected due to pumping up and discharging sea water for the power plant operation. However, extent of impact is unknown at present.	(II, III, IV) 1) Hydrological condition data in Jordan and planned area. 2) Distribution of surface water bodies (rivers, Wadis, etc.) and groundwater basin in planned area.	(II, III, IV) Monitoring hydrological condition of rivers, Wadis and groundwater
21) Coastal zone	В	(II, III, IV) There is a possibility that change in oceanographic conditions and coastal erosion/sedimentation due to construction and decommissioning work and pumping up sea water for storage inland reservoir at operation stage. However, extent of impact is unknown at present.	(II, III, IV) 1) Regulation of development and environmental conservation in coastal area. 2) Existing environmental condition of coastal area.	(II, III, IV) 1) Appropriate preventive measures against coastal erosion, and sedimentation of sand and soil in the plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand by physical observation and utilizing satellite image map.
22) Environment ally sensitive areas (Protected Areas, IBAs etc.)	В	(II, III, IV) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.
23) Flora, Fauna, Ecosystem and Biodiversity	В	(II, III, IV) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally

		biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area.	biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	sensitive areas.
24) Landscape	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a possibility of deterioration aesthetic value of landscape by spatial occupancy of power plants and related facilities.	 (III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable landscape. 	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by design and tree planting in the plan.
25) Micro-climat e	С	(II, III, IV) Most areas of Jordan are topographically flat and occupied by desert. Thus even a small change of topographical features such as appearance of new structures and facilities may cause influence to microclimate condition such as wind. However, extent of impact is unknown at present.	(II, III, IV) Meteorological data in Jordan and planned area including cases and causes of change in micro-climate in Jordan and planned area.	(II, III, IV) Monitor micro-climate by meteorological data and physical observation.
26) Global Warming	В	 (II, IV) Generation of greenhouse gases (GHG) such as CO₂ and CH₄ is not exepcted from operation of wind power plant. However, generation of GHG is expected from construction vehicles and machines during construction and decommissioning stage. 	(II, IV) 1) Existing data of greenhouse gases emission in Jordan and planned area. 2) Anticipated greenhouse gases emission from construction and decommissioning work.	(II, IV) Preventive measures to reduce greenhouse gases emission in construction and decommissioning work.

(3) Environme	ntal Pollu	However, extent of emission is not known at present		
27) Air pollution	В	(II, IV) Generation of air pollutants such as dust and NOx are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from construction and decommissioning work 	(II, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	В	(II, IV) Generation of water pollutants such as SS and BOD is expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of water pollutants from construction and decommissioning work 	(II, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work. 2) Monitor water pollutants discharge and environmental water quality.
29) Soil contaminatio n	В	 (II, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work. However, features of the contamination is unknown at present. 	 (II, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area. 	(II, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work. 2) Monitor soil contamination.

30) Bottom sediment	С	(II, IV) In case of power facility is located in coastal area, some impact on coastal conditions is expected due toconstruction and decommissioning work. However, extent of impact is unknown at present.	(II, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, IV) Monitoring bottom sediment contamination.
31) Soild waste	В	(II, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work.	(II, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioni ng stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3) Anticipated generation of noise and vibration from from construction and decommissioning work. 	(II, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during construction and decommissioning work.
33) Ground Subsidence	С	(II, III) There is a possibility of ground subsidence if extraction of a large scale extraction of groundwater is included in the project plan. However,	(II, III) 1) Regulation of ground subsidence. 2) Cases and causes ground subsidence in Jordan and planned area.	(II, III) Monitor occurrence of ground subsidence by physical observation.

		at present iti is unknown.		
34) Offensive odor	С	(II, IV) There is a possibility of offensive odor due to mal-functioned vehicles and construction machines during construction and decommissioning stage. However, at present it is unknown.	(II, IV) 1) Regulation of offensive odor. 2) Cases and causes of offensive odor issues in Jordan and planned area.	(II, IV) Preventive measures for generation of offensive odor from construction and decommissioning work.
35) Sunshine inhibition/Re flection of sunlight	С	(III) 1) If the power plants and related facilities are installed in densely populated area and surrounded by tall buildings, sunshine inhibition is somewhat expected. However, at present it is unknown. 2) As the solar panel is not installed, reflection of sunlight is not expected.	(III) 1) Regulation of sunshine inhibition. 2) Cases and causes of sunshine inhibition in Jordan and planned area.	(III) 1) To avoid site location close to densely populated area and tall buildings.
36) Electromagne tic interference	С	(III) If the power plants and related facilities are installed in densely populated area and surrounded by tall buildings, electromagnetic interference is somewhat expected. However, at present it is unknown.	(III) 1) Regulation of electromagnetic interference. 2) Cases and causes of electromagnetic interference issues in Jordan and planned area.	(III) 2) To avoid site location close to densely populated area and tall buildings.
37) Safety from Electromagne tic Field	С	(III) If the power plants and related facilities are installed keeping with sufficient distance and height from houses and other structures, it is expected that strength of	 (III) 1) Regulation of safety from electromagnetic field. 2) Cases and causes of safety issues from electromagnetic filed in Jordan and planned 	(III) 3) To keep location of power plants and related facilities with sufficient distance and height from houses and other structures.

		the electromagnetic field in ground level and upper floor level will be above the public electromagnetic exposure limit of the ICNIRP (International Commission for Non-Ionizing Radiation Protection). However, at present it is unknown.	area.	
(4) Permit, Ex	planation :	and Others		
Subject	C		 (T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3) Information disclosure. 4) Stakeholder participation. 5) International Treaties, Agreements, Convention. 	 (T) Comparison of Alternative Plans. 2) Environmental Management Plan, Environmental Monitoring Plan, Emergency Action Plan etc.

(6) Wind Power Generation

Table 9.4.3 (12) Matrix Expression of Negative Impacts

Environmental item *, **	Rating ***, ****					
	Т	Ι	II	Ш	IV	
(1) Social Environment						
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В	
2) Local economy such as employment and livelihood etc.	С	С	С	С	С	
3) Energy use	С	С	С	С	С	
4) Water use	В	В	В	В	В	

5) Land use and utilization of local resources	A/B	A/B	A/B	A/B	С
6) Social institutions such as social infrastructure and local decision-making institutions, a split of communities	C	С	С	С	С
7) Existing social infrastructures and services	С	С	С	С	С
8) The poor, indigenous of ethnic people	С	С	С	С	С
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	С	С	С	С
10) Local conflict of interests	С	С	С	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	С	С	С	С	С
13) Public health and Sanitation	С	D	С	С	С
14) Infectious diseases such as HIV/AIDS	С	D	С	С	С
15) Working condition including occupational safety	С	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	В	D	В	В	В
(2) Natural Environment			L	L	
18) Topography and Geology	С	D	С	С	С
19) Soil erosion/sand movement	С	D	С	С	С
20) Movement of water/Hydrological situation	С	D	С	С	С
21) Coastal zone	В	D	В	В	В
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	С	D	С	С	С
26) Global Warming	В	D	В	С	В
(3) Environmental Pollution		<u> </u>	<u>I</u>	<u>I</u>	<u> </u>
27) Air pollution	В	D	В	D	В

28) Water pollution	В	D	В	D	В
29) Soil contamination	В	D	В	В	С
30) Bottom sediment	С	D	C	С	С
31) Soild waste	В	D	В	С	В
32) Noise and Vibration	В	D	В	В	C
33) Ground Subsidence	С	D	С	С	C
34) Offensive odor	С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight	С	D	C	В	С
36) Electromagnetic interference	С	D	C	С	С
37) Safety from Electromagnetic Field	С	D	C	С	С
(4) Permit, Explanation and Others			1	1	1
Subject	С				
	I	 	Irce: IIC		T

Table 9.4.3 (13) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation Measures

Environme ntal item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures	
(1) Social Environment					
1) Land	A/B	(T) To secure the	(T) 1) Laws and	(T) 1) Consider alternative	
acquisition		lands/spaces for planned	regulations for	plans to avoid and/or	
and		wind power plants and	involuntary resettlement	minimize the occurrence	
resettlement		related facilities, there is a	(land acquisition and	of involuntary	
(Involuntary		possibility of involuntary	resettlement) and	resettlement. 2) Detailed	
resettlement)		resettlement including land	easement/wayleaves. 2)	inventory survey on plots,	
		acquisition and resettlement	Land use regulation and	facilities, structures and	
		as well as wayleaves,	existing land use in	peoples living along the	
		generation of Project	Jordan and planned area.	planned railway routes. 3)	
		Affected Persons (PAPs),	3) Cases and causes of	Survey on encroachment	
		although it depends on the	involuntary resettlement	on ROW (Right Of Way)	
		details of the plan (site	in Jordan and planned	of the planned	

		location/route, scale, components etc.).	area. 4) Anticipated land area and location for the site to be secured by the plan.	site/alignment. 4) Examine procedure and condition of involuntary resettlement and compensation to PAPs taking relevant laws in Jordan and the JICA Guidelines into
				considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as
				possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
2) Local economy such as employment and livelihood etc.	С	 (T) Beneficial impacts are expected on local economy; (i) creation of employment opportunity for civil work during construction and decommissioning stage, (ii) new power generation may improve living condition. However, extent of impact is unknown at present. 	 (T) 1) Development PPPs of Jordan and other sectors (tourism, industry, mining, regional development etc.) 2) Labor force and employment and working needs in planned area. 	(T) 1) Promote consistency and synergy with other development plans (PPPs) by whole country and other sectors.
3) Energy use	С	(T) As the wind power is used for energy source, no negative impact is expected.	(T) Meteorological data about wind conditions.	(T) Consider the plan to select site location with good wind conditions.
4) Water use	В	(II, IV) Jordan has very limited water resources and available water resources continue to fall with	(T) 1) Laws and regulations for water use and water extraction form water resources. 2)	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of

		population growth everywhere in the country. Thus, water supply for construction and decommissioning work is expected to face severe competence with other water supply.	Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	power plants and related facilities in the plan. 2) Monitor water consumption in the plan.
5) Land use and utilization of local resources	A/B	(V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities.	(T) 1) Laws andregulation for use of landand resources. 2)Existing and future landand resources use inJordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.
6) Social institutions such as social infrastructur e and local decision-ma king institutions, a split of communities	С	(T) There is a possibility of missing acceptance by the communities and causing split of community, if the plan is not properly informed to relevant stakeholders including community based organizations for participation.	(T) Information of administrative and social structures and decision-making process and institutions in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered for stakeholders including decision-makers of the communities from early stage of planning for obtaining thorough understanding and consensus of the people and communities by promoting that the plan may contribute to improvement of local economy and upgrading living conditions.
7) Existing social infrastructur es and services	С	(T) Electricity supply by power plants and related facilities will contribute to improvement condition of basic infrastructure and at the same time to upgrading social services. However,	(T) 1) Laws and regulations for social infrastructures and services. 2) Existing situation of social infrastructures and services in Jordan and	(T) 1) Avoid or minimize disturbance existing social infrastructures and services in the plan. 2) Promote synergy with plans for other social infrastructure and services.

		extent of impact is unknown at present.	planned area.	
8) The poor, indigenous of ethnic people	С	 (T) Power plants and related facilities is expected to contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity. However, it is unknown whether the poor and vulnerables are able to enjoy the benefit equally or not at present. 	(T) 1) Data of vulnerable groups such as the poor, female, children, elders, disabled, refugees and indigenous ethnic people in Jordan and planned area. 2) Supporting activities to living and livelihood condition by Jordan Government and donors.	 (T) 1) Give higher priority to the vulnerable groups in the planned area with having a chance to get jobs and training to get working skills in the plan. 2) The vulnerable people should be taken fully considerations to compensate properly or support to restore the present living condition in case of involuntary resettlement, even if they are illegal occupants.
9) Misdistributi on of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of misdistribution of benefit and damage, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public participation.	(T) Cases and causes of misdistribution of benefit and damage by the development plans of electric sector and others in Jordan and planned area.	(T) Information disclosure and public participation should be fully considered from early stage to obtain thorough understanding the plan and consensus among the communities and PAPs in order to share with benefit and damage equally.
10) Local conflict of interests	С	(T) Beneficial impacts such as contribute to creation of employment opportunity for construction and	(T) Cases and causes of local conflict of interests by the development plans of electric sector and	(T) Information disclosure and public participation should be fully considered from early stage to obtain

		decommissioning work and improvement living condition by supply of electricity through power plants and related facilities. However, there is a possibility of generation of local conflict, if the plan is not appropriately accepted to relevant stakeholders including communities through proper information disclosure and public participation.	others in Jordan and planned area.	thorough understanding the plan and consensus among the communities and PAPs in order to avoid or minimize local conflict of interests.
11) Cultural property and heritage	В	(II, III,) In Jordan sites of cultural properties and heritages are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	(II, III) 1) Laws and regulations of cultural property and heritage site. 2) Distribution of cultural property and heritage site in Jordan and the planned area.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
12) Fishing rights, water rights and rights of common	С	(T) There is a possibility of disturbing fishing rights, water rights and rights of common depending on the project plan. However, extent of impact is unknown at present.	(T) Situation of fishing rights, water rights and rights of common in Jordan and planned area.	(T) Promote participation of those who have the rights in order to get their opinion and ensuring understanding and making consent in the course of the stakeholder meeting from the planning stage
13) Public health and Sanitation	В	(II, IV) There is a possibility of deterioration respiratory functions due to inhalation of air pollutants such as NOx and PM10, if control of	(II, III, IV) 1) Laws and regulations of public health and sanitation. 2) Public health condition including respiratory	(T) 1) Preventive measures to control air pollutants emission in construction and decommissioning work

		pollutants emission in construction and decommissioning work is not conducted appropriately. However, at present extent of impact is unknown.	disease and distribution of medical facilities in Jordan and planned area.	and in operation of power plants and related facilities. 2) Monitor public health condition by medical examination.
14) Infectious diseases such as HIV/AIDS	С	(II, IV) In many developing countries spreading of infectious diseases such as HIV/AIDS were often reported due to contact of workers with affected peoples at their camp in construction work. Thus, it is expected somewhat spreading of infectious diseases during construction and decommissioning stage. However, extent of impact is unknown at present.	(II, IV) 1) Regulations for infectious diseases. 2) Cases and causes of infectious diseases such as HIV/AIDS in Jordan and planned area.	(II, IV) 1) Enlightenment and education of infectious diseases to people and workers. 2) Monitoring prevalence and safety shoes and hats. (3) Regular check of occupational safety and health condition.
15) Working condition including occupational safety	C	(II, III, IV) Adverse impacts on working condition including occupational safety are expected somewhat due to insufficient management of workers at construction and decommissioning work, and at operation of power plants and related facilities. However, extent of impact is unknown at present.	 (II, III, IV) 1) Regulation for labor and occupational health and safety. 2) Cases and causes of working condition issues including occupational health and safety in Jordan and planned area. 3) Management plan for working condition in construction and decommissioning work, and in operation of power plants and related facilities. 	(II, III, IV) 1) Prepare tangible safety considerations in place for individuals involved in the plan, such as the installation of safety equipment which prevents accidents, and management of hazardous materials. 2) Plan and implement intangible measures for individuals involved in the plan, such as the establishment of a safety and health program, and safety training for workers etc. 3) Monitoring occupational health and safety condition.

16) Hazard/risk (disaster, security)	В	 (T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict. 	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accidents	В	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natural E	nvironme	nt		
18) Topography and Geology	С	(II, IV) There is a possibility of causing adverse impact, if that a large-scale alteration of topographic and geologic features are included in construction plan of power plants and related facilities. However, extent of impact is unknown at present.	 (II, IV) 1) Topographical and geological data in Jordan and planned area. 2) Anticipated amount of construction materials for procurement and removal of soil and stones for land clearance of power plants and related facilities. 	(II, IV) 1) To avoid site and route with unstable and easy to collapsing condition. 2) To avoid land with topographical or geological importance.
19) Soil erosion/sand movement	С	(II, IV) There is a possibility of occurrence of soil erosion, if that a large-scale alteration of topographic and geologic features as well as cutting and filling of surface soil are included in construction plan	(II, IV) 1) Regulation for soil erosion and land slide. 2) Cases and causes of soil erosion and land slide in Jordan and planned area.	(II, IV) To avoid site and route with unstable soil condition in the area likely to occurrence of soil erosion and land slide.

20)	C	of power plants and related facilities. However, extent of impact is unknown at present.		(II III IV) Monitoring
20) Movement of water/Hydro logical situation	C	(II, III, IV) There is a possibility that hydrological conditions such as water flow and water level are adversely affected due to landing work of fuels and other materials at port and/or water storage by pumping up at hydropower plant. However, extent of impact is unknown at present.	(II, III, IV) 1) Hydrological condition data in Jordan and planned area. 2) Distribution of surface water bodies (rivers, Wadis, etc.) and groundwater basin in planned area.	(II, III, IV) Monitoring hydrological condition of rivers, Wadis and groundwater
21) Coastal zone	С	(II, IV) In case of power facility is located in coastal area, some impact on coastal conditions is expected due toconstruction and decommissioning work. However, extent of impact is unknown at present.	(II, IV) 1) Regulation of development and environmental conservation in coastal area. 2) Existing environmental condition of coastal area.	(II, IV) 1) Appropriate preventive measures against coastal erosion, and sedimentation of sand and soil in the plan. 2) Monitor oceanographic conditions, and coastal erosion and sedimentation of sand by physical observation and utilizing satellite image map.
22) Environment ally sensitive areas (Protected Areas, IBAs etc.)	В	(II, III, IV) 1) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area. 2) In addition, hill and mountainous areas are transfer route of transboundary migratory birds between Europe/Asia	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.

		and Africa. Therefore, there is a possibility of migratory birds striking to wind tower.		
23) Flora, Fauna, Ecosystem and Biodiversity	В	(II, III, IV) 1) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area. 2) In addition, hill and mountainous areas are transfer route of transboundary migratory birds between Europe/Asia and Africa. Therefore, there is a possibility of migratory birds striking to wind tower.	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally sensitive areas.
24) Landscape	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a possibility of deterioration aesthetic value of landscape by spatial occupancy of wind tower.	(III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable landscape.	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by design and tree planting in the plan.
25) Micro-clima te	С	 (II, III, IV) Most areas of Jordan are topographically flat and occupied by desert. Thus even a small change of topographical features such as appearance of new structures and facilities may cause influence to microclimate condition such 	(II, III, IV) Meteorological data in Jordan and planned area including cases and causes of change in micro-climate in Jordan and planned area.	(II, III, IV) Monitor micro-climate by meteorological data and physical observation.

		as wind. However, extent of impact is unknown at present.		
26) Global Warming	В	(II, IV) Generation of greenhouse gases (GHG) such as CO_2 and CH_4 is not expected from operation of wind power plant. However, generation of GHG is expected from construction vehicles and machines during construction and decommissioning stage. However, extent of emission is not known at present	(II, IV) 1) Existing data of greenhouse gases emission in Jordan and planned area. 2) Anticipated greenhouse gases emission from construction and decommissioning work.	(II, IV) Preventive measures to reduce greenhouse gases emission in construction and decommissioning work.
(3) Environm	iental Poll	ution		
27) Air pollution	B	(II, IV) Generation of air pollutants such as dust and NOx are expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from construction and decommissioning work	(II, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	В	(II, IV) Generation of water pollutants such as SS and BOD is expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of water pollutants from construction and decommissioning work	(II, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work. 2) Monitor water pollutants discharge and environmental water quality.

29) Soil contaminatio n	В	(II, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work. However, features of the contamination is unknown at present.	(II, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work. 2) Monitor soil contamination.
30) Bottom sediment	В	 (II, IV) In case of power facility is located in coastal area, some impact on coastal conditions is expected due to construction and decommissioning work. However, extent of impact is unknown at present. 	(II, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, IV) Monitoring bottom sediment contamination.
31) Solid waste	В	(II, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of solid waste from construction and decommissioning work. 	(II, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissio ning stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3) Anticipated generation of noise and vibration from construction and decommissioning work.	(II, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during construction and decommissioning work.

33) Ground Subsidence	С	(II, III) There is a possibility of ground subsidence if extraction of a large scale extraction of groundwater is included in the project plan. However, at present iti is unknown.	(II, III) 1) Regulation of ground subsidence. 2) Cases and causes ground subsidence in Jordan and planned area.	(II, III) Monitor occurrence of ground subsidence by physical observation.
34) Offensive odor	С	 (II, IV) There is a possibility of offensive odor due to mal-functioned vehicles and construction machines during construction and decommissioning stage. However, at present it is unknown. 	(II, IV) 1) Regulation of offensive odor. 2) Cases and causes of offensive odor issues in Jordan and planned area.	(II, IV) Preventive measures for generation of offensive odor from construction and decommissioning work.
35) Sunshine inhibition/re flection	С	 (III) 1) If the power plants and related facilities are installed in densely populated area and surrounded by tall buildings, sunshine inhibition is somewhat expected. However, at present it is unknown. 2) As the solar panel is not installed, reflection of sunlight is not expected. 	(III) 1) Regulation of sunshine inhibition. 2) Cases and causes of sunshine inhibition in Jordan and planned area.	(III) 1) To avoid site location close to densely populated area and tall buildings.
36) Electromagn etic interference	С	(III) If the power plants and related facilities are installed in densely populated area and surrounded by tall buildings, electromagnetic interference is somewhat expected. However, at present it is unknown.	(III) 1) Regulation of electromagnetic interference. 2) Cases and causes of electromagnetic interference issues in Jordan and planned area.	(III) 2) To avoid site location close to densely populated area and tall buildings.
37) Safety from Electromagn etic Field	С	(III) If the power plants and related facilities are installed keeping with sufficient distance and height from houses and other structures, it	(III) 1) Regulation of safety fromelectromagnetic field. 2)Cases and causes of safety issues from	(III) 3) To keep location of power plants and related facilities with sufficient distance and height from houses and other

		is expected that strength of the electromagnetic field in ground level and upper floor level will be above the public electromagnetic exposure limit of the ICNIRP (International Commission for Non-Ionizing Radiation Protection). However, at present it is unknown.	electromagnetic filed in Jordan and planned area.	structures.
(4) Permit, E	xplanatio	n and Others		
Subject	C		 (T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3) Information disclosure. 4) Stakeholder participation. 5) International Treaties, Agreements, Convention. 	 (T) Comparison of Alternative Plans. 2) Environmental Management Plan, Environmental Monitoring Plan, Emergency Action Plan etc.

(7) Solar Power Generation

Table 9.4.3 ((14) Matrix	Expression	of Negative Impacts
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Environmental item *, **		Rating ***, ****					
	Т	Ι	II	III	IV		
(1) Social Environment							
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В		
2) Local economy such as employment and livelihood etc.	С	С	С	С	С		
3) Energy use	С	С	D	D	D		
4) Water use	В	С	В	С	В		
5) Land use and utilization of local resources	В	В	В	D	В		
6) Social institutions such as social infrastructure and local	С	С	С	C	С		

decision-making institutions, a split of communities					
7) Existing social infrastructures and services	C	С	С	С	С
8) The poor, indigenous of ethnic people	С	С	С	С	С
9) Misdistribution of benefit and damage (Equality of benefits and losses and equality involved in development process)	С	С	C	С	С
10) Local conflict of interests	С	С	С	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	С	С	С	С	С
13) Public health and Sanitation	В	D	В	С	В
14) Infectious diseases such as HIV/AIDS	С	D	С	С	С
15) Working condition including occupational safety	С	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	В	D	В	В	В
(2) Natural Environment				I	
18) Topography and Geology	С	D	С	C	С
19) Soil erosion/sand movement	С	D	С	С	С
20) Movement of water/Hydrological situation	С	D	С	С	С
21) Coastal zone	С	D	С	D	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	С
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	В	D	С	В	С
26) Global Warming	В	D	В	D	В
(3) Environmental Pollution					<u> </u>
27) Air pollution	В	D	В	D	В
28) Water pollution	В	D	В	D	В
29) Soil contamination	В	D	В	В	С

30) Bottom sediment	С	D	С	С	С	
31) Soild waste		В	D	В	С	В
32) Noise and Vibration		В	D	В	В	С
33) Ground Subsidence	С	D	С	С	С	
34) Offensive odor		С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight		С	D	С	В	С
36) Electromagnetic interference		С	D	С	С	С
37) Safety from Electromagnetic Field		С	D	С	С	С
(4) Permit, Explanation and Others						
Subject		С				
			G	ПСА	Study T	1

Table 9.4.3	(15) AnticipatedNegative Impacts and Necessary Information/Date and Possible
	Mitigation Measures

Environ mental item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
(1) Social I	Environm	ent		
1) Land	A/B	(T) To secure the	(T) 1) Laws and	(T) 1) Consider alternative
acquisitio		lands/spaces for planned	regulations for involuntary	plans to avoid and/or minimize
n and		solar photovoltaic power	resettlement (land	the occurrence of involuntary
resettlem		plants and related	acquisition and	resettlement. 2) Detailed
ent		facilities, there is a	resettlement) and	inventory survey on plots,
(Involunt		possibility of involuntary	easement/wayleaves. 2)	facilities, structures and peoples
ary		resettlement including	Land use regulation and	living along the planned railway
resettlem		land acquisition and	existing land use in Jordan	routes. 3) Survey on
ent)		resettlement as well as	and planned area. 3) Cases	encroachment on ROW (Right
		wayleaves, generation of	and causes of involuntary	Of Way) of the planned
		Project Affected Persons	resettlement in Jordan and	site/alignment. 4) Examine
		(PAPs), although it	planned area. 4)	procedure and condition of
		depends on the details of	Anticipated land area and	involuntary resettlement and
		the plan (site	location for the site to be	compensation to PAPs taking
		location/route, scale,		relevant laws in Jordan and the

		components etc.).	secured by the plan.	JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
4) Water	В	(II, IV) Jordan has very limited water resources	(T) 1) Laws and regulations for water use	(T) 1) Consider minimize water use in construction and
use		and available water resources continue to fall	and water extraction form water resources. 2) Water	decommissioning work and in operation of power plants and
		with population growth	demand and supply in	related facilities in the plan. 2)
		everywhere in the country. Thus, water	Jordan and planned area. 3) Anticipated water use in	Monitor water consumption in the plan.
		supply for construction	construction and	
		and decommissioning work is expected to face	decommissioning work and in operation of power	
		severe competence with other water supply.	plants and related facilities.	
5) Land	В	(V) Some alteration of	(T) 1) Laws and regulation	(T) Consider appropriate and
use and utilizatio		existing land use and utilization of local	for use of land and resources. 2) Existing and	effective utilization of land and resources in the plan.
n of local		resources is expected.	future land and resources	resources in the plan.
resources		Especially to generate a	use in Jordan and planned	
		large scale solar photovoltaic power, there	area.	
		is a possibility of a large		
		scale land reclamation.		
11)	В	(II, III,) In Jordan sites	(II, III) 1) Laws and	(T) 1) Avoid the site and route
Cultural		of cultural properties and heritages are distributed	regulations of cultural property and heritage site.	penetrating or close to the sites of cultural properties, heritages
property and		in the whole country.	2) Distribution of cultural	and archaeological importance
heritage		Thus, adverse impact on	property and heritage site	in the plan. 2) If any buried
		them is expected, if the	in Jordan and the planned	cultural properties are found at

		site of power plants and related facilities is located within or close to the site.	area.	construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
16) Hazard/ri sk (disaster, security)	В	(T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict.	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accident s	В	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and decommissioning work and in operation of power plants and related facilities.	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
(2) Natura	l Environ	ment		
22) Environ mentally sensitive areas (Protecte d Areas, IBAs etc.)	В	 (II, III, IV) 1) In Jordan designated Protected Areas and Important Bird and Biodiversity Conservation Areas (IBAs) are distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related 	(II, III, IV) 1) Distribution of designated Protected Areas, natural reserves and IBAs as well as parks in Jordan and the planned area. 2) Regulations for conservation of natural environment.	(II, III, IV) To avoid site location within or close to the designated Protected Areas and parks.

		facilities is located within or close to the area. 2) In addition, hill and mountainous areas are transfer route of transboundary migratory birds between Europe/Asia and Africa. Therefore, there is a possibility of migratory birds striking to solar power panel.		
23) Flora, Fauna, Ecosyste m and Biodivers ity	В	(II, III, IV) 1) In Jordan there are found many precious plant and animal species as well as important areas of valuable ecosystem and biodiversity. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the area. 2) In addition, hill and mountainous areas are transfer route of transboundary migratory birds between Europe/Asia and Africa. Therefore, there is a possibility of migratory birds striking to solar power panel.	(II, III, IV) 1) Distribution of site with valuable plant and animal species, ecosystem and biodiversity in Jordan and the planned area. 2) Regulations for conservation of plant, animal species and biodiversity.	(II, III, IV) To avoid site location within or close to distribution areas of valuable plant and animal species, and environmentally sensitive areas.
24) Landscap e	В	(III) In Jordan cultural and heritage sites are distributed in the whole country and they consist of attractive landscape. Thus, there is a	(III) 1) Distribution of site with valuable landscape in Jordan and the planned area. 2) Regulation for preserving valuable	(III) 1) To avoid site location close to existing important landscape. 2) Measures to harmonize power plants and related facilities with surrounding landscape by

26)	В	possibility of deterioration aesthetic value of landscape by spatial occupancy of a large scale solar power panels. (II, IV) Generation of	landscape.	design and tree planting in the plan.
26) Global	В	(II, IV) Generation of greenhouse gases (GHG)	(II, IV) 1) Existing data of greenhouse gases emission	(II, IV) Preventive measures to reduce greenhouse gases
Warming		such as CO ₂ and CH ₄ is not exepcted from operation of solar power plant. However, generation of GHG is expected from construction vehicles and machines during construction and decommissioning stage. However, extent of emission is not known at present	in Jordan and planned area. 2) Anticipated greenhouse gases emission from construction and decommissioning work.	emission in construction and decommissioning work.
(3) Enviro	nmental F	Pollution		
27) Air pollution	В	(II, IV) Generation of air pollutants such as dust and NOx are expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from construction and decommissioning work	(II, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	В	(II, IV) Generation of water pollutants such as SS and BOD is expected due to earth moving and engineering works during construction and	(II, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and planned area. 3) Anticipated discharge of	(II, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work. 2) Monitor water pollutants discharge and environmental

		decommissioning stage.	water pollutants from construction and decommissioning work	water quality.
29) Soil contamin ation	В	(II, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work. However, features of the contamination is unknown at present.	(II, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work. 2) Monitor soil contamination.
31) Soild waste	В	(II, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work. 	(II, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioning stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.
32) Noise and Vibration	В	(II, IV) Generation of noise and vibration are expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation of noise and vibration. 2) Generation and ambient level of noise and vibration in Jordan and planned area. 3) Anticipated generation of noise and vibration from from construction and decommissioning work. 	(II, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during construction and decommissioning work.

35)	В	(III) 1) If the power	(III) 1) Regulation of	(III) 1) To avoid site location
Sunshine		plants and related	sunshine inhibition. 2)	close to densely populated area
inhibition		facilities are installed in	Cases and causes of	and tall buildings. 2) To install
/Reflectio		densely populated area	sunshine inhibition in	solar panel with sufficient
n of		and surrounded by tall	Jordan and planned area.	distance from surrounding
sunlight		buildings, sunshine		facilirties and structures, and
		inhibition is somewhat		setting angle of the panel to
		expected. However, at		minimize sunlight reflection.
		present it is unknown. 2)		
		There is a possibility of		
		dazzling impact due to		
		sunlight reflection by		
		solar panel, if the panel is		
		not installed		
		appropriately.		
(4) Permit,	, Explana	tion and Others		
Subject	С		(T) 1) Methodology of	(T) Comparison of Alternative
			Environmental Impact	Plans. 2) Environmental
			Assessment in Jordan. 2)	Management Plan,
			Items and Procedures for	Environmental Monitoring
			Permit/Approval. 3)	Plan, Emergency Action Plan
			Information disclosure. 4)	etc.
			Stakeholder participation.	
			5) International Treaties,	
			Agreements, Convention.	

(8) Transmission and Distribution Network System

Environmental item *, **	Rating ***, ****						
	Т	I	II	Ш	IV		
(1) Social Environment							
1) Land acquisition and resettlement (Involuntary resettlement)	A/B	A/B	В	В	В		
2) Local economy such as employment and livelihood etc.	С	С	С	С	С		
3) Energy use	С	С	D	D	D		

 Table 9.4.3
 (16) Matrix Expression of Negative Impacts

4) Water use	В	С	В	С	В
5) Land use and utilization of local resources	В	В	В	С	С
6) Social institutions such as social infrastructure and local	C	С	С	С	С
decision-making institutions, a split of communities					
7) Existing social infrastructures and services	C	С	С	С	С
8) The poor, indigenous of ethnic people	С	С	С	С	С
9) Misdistribution of benefit and damage (Equality of benefits and	C	С	С	С	С
losses and equality involved in development process)					
10) Local conflict of interests	C	С	С	С	С
11) Cultural property and heritage	В	D	В	С	С
12) Fishing rights, water rights and rights of common	С	С	С	С	С
13) Public health and Sanitation	B/C	D	В	С	В
14) Infectious diseases such as HIV/AIDS	С	D	С	С	С
15) Working condition including occupational safety	C	D	С	С	С
16) Hazard/risk (disaster, security)	В	В	В	В	В
17) Accidents	В	D	В	В	В
(2) Natural Environment	_		I	I	I
18) Topography and Geology	C	D	C	C	C
19) Soil erosion/sand movement	C	D	С	С	С
20) Movement of water/Hydrological situation	C	D	С	С	С
21) Coastal zone	C	D	С	D	С
22) Environmentally sensitive areas (Protected Areas, IBAs etc.)	В	D	В	В	C
23) Flora, Fauna, Ecosystem and Biodiversity	В	D	В	В	С
24) Landscape	В	D	В	В	С
25) Micro-climate	C	D	С	С	С
26) Global Warming	В	D	В	С	В
(3) Environmental Pollution	_		<u> </u>	<u> </u>	<u> </u>

27) Air pollution	В	D	В	D	В
28) Water pollution	В	D	В	D	В
29) Soil contamination	В	D	В	В	С
30) Bottom sediment	С	D	С	C	С
31) Soild waste	В	D	В	С	В
32) Noise and Vibration	В	D	В	В	С
33) Ground Subsidence	С	D	С	С	С
34) Offensive odor	С	D	С	С	С
35) Sunshine inhibition/Reflection of sunlight	С	D	С	В	С
36) Electromagnetic interference	С	D	С	С	С
37) Safety from Electromagnetic Field	С	D	С	С	С
(4) Permit, Explanation and Others			1	1	1
Subject					
	1		по	A Chuda	-

Table 9.4.3 (17) AnticipatedNegative Impacts and Necessary Information/Date and Possible Mitigation Measures

Environm ental item *, **	Rating ***, ****	Reasons	Further Necessary Information/Data	Possible Mitigation Measures
(1) Social E	nvironmer	ıt		
1) Land	A/B	(T) To secure the	(T) 1) Laws and	(T) 1) Consider alternative plans
acquisition		lands/spaces for	regulations for involuntary	to avoid and/or minimize the
and		planned power network	resettlement (land	occurrence of involuntary
resettlemen		system	acquisition and	resettlement. 2) Detailed
t		(transmission/distributi	resettlement) and	inventory survey on plots,
(Involuntar		on line, substation and	easement/wayleaves. 2)	facilities, structures and peoples
у		related facilities), there	Land use regulation and	living along the planned railway
resettlemen		is a possibility of	existing land use in Jordan	routes. 3) Survey on
t)		involuntary	and planned area. 3) Cases	encroachment on ROW (Right
		resettlement including	and causes of involuntary	Of Way) of the planned
		land acquisition and	resettlement in Jordan and	site/alignment. 4) Examine
		resettlement as well as	planned area. 4)	procedure and condition of

		wayleaves, generation of Project Affected Persons (PAPs), although it depends on the details of the plan (site location/route, scale, components etc.).	Anticipated land area and location for the site to be secured by the plan.	involuntary resettlement and compensation to PAPs taking relevant laws in Jordan and the JICA Guidelines into considerations. 5) From early stage of the project, pay attention to information disclosure and consultation with stakeholders including PAPs for thorough understanding of the issues or to make agreement as much as possible. 6) Elaborate Resettlement Action Plan (RAP), if involuntary resettlement is unavoidable.
4) Water use	В	(II, IV) Jordan has very limited water resources and available water resources continue to fall with population growth everywhere in the country. Thus, water supply for construction and decommissioning work is expected to face severe competence with other water supply.	(T) 1) Laws and regulations for water use and water extraction form water resources. 2) Water demand and supply in Jordan and planned area. 3) Anticipated water use in construction and decommissioning work and in operation of power plants and related facilities.	(T) 1) Consider minimize water use in construction and decommissioning work and in operation of power plants and related facilities in the plan. 2) Monitor water consumption in the plan.
5) Land use and utilization of local resources	В	 (V) Some alteration of existing land use and utilization of local resources is expected. However, extent of impact depends on the plan of power plants and related facilities. 	(T) 1) Laws and regulation for use of land and resources. 2) Existing and future land and resources use in Jordan and planned area.	(T) Consider appropriate and effective utilization of land and resources in the plan.
11) Cultural property	В	(II, III,) In Jordan sites of cultural properties and heritages are	(II, III) 1) Laws and regulations of cultural property and heritage site.	(T) 1) Avoid the site and route penetrating or close to the sites of cultural properties, heritages

and heritage		distributed in the whole country. Thus, adverse impact on them is expected, if the site of power plants and related facilities is located within or close to the site.	2) Distribution of cultural property and heritage site in Jordan and the planned area.	and archaeological importance in the plan. 2) If any buried cultural properties are found at construction work, report and consult with concerned organizations such as Ministry of Tourism and Antiquities without delay.
13) Public health and Sanitation	В	(II, IV) There is a possibility of deterioration respiratory functions due to inhalation of air pollutants such as NOx and PM10, if control of pollutants emission in construction and decommissioning work is not conducted appropriately. However, at present extent of impact is unknown.	(II, III, IV) 1) Laws and regulations of public health and sanitation. 2) Public health condition including respiratory disease and distribution of medical facilities in Jordan and planned area.	(T) 1) Preventive measures to control air pollutants emission in construction and decommissioning work and in operation of power plants and related facilities. 2) Monitor public health condition by medical examination.
16) Hazard/risk (disaster, security)	В	(T) No additional risk of disaster and public security are expected due to installation of power plant and related facilities. However, there is a possibility of increase in disaster and security risk, if the site is located to close to neighboring countries in conflict.	(T) 1) Cases and causes of hazard risks due to disaster in Jordan and the planned area. 2) Existing condition of public security due to uncertain political situation and conflict of neighboring countries.	(T) 1) Monitor uncertain condition of neighboring countries. 2) Prepare emergency action plan for hazard and public security risks.
17) Accidents	В	(II, III, IV) Occurrence of accidents is expected somewhat, if inappropriate handling	(II, III, IV) 1) Cases and causes of accidents in Jordan and planned area in construction and	(II, III, IV) 1) Preventive measures to accidents in construction and decommissioning work and in

(2) Natural 1		and management of construction and decommissioning work, and insufficient operation of installed power plants and related facilities are carried out.	decommissioning work and in operation of power plants and related facilities.	operation of power plants and related facilities. 2) Prepare emergency action plan for accidents.
22)	В	(II, III, IV) 1) In Jordan	(II, III, IV) 1) Distribution	(II, III, IV) To avoid site
Environme		designated Protected	of designated Protected	location within or close to the
ntally		Areas and Important	Areas, natural reserves and	designated Protected Areas and
sensitive		Bird and Biodiversity	IBAs as well as parks in	parks.
areas		Conservation Areas	Jordan and the planned	
(Protected		(IBAs) are distributed	area. 2) Regulations for conservation of natural	
Areas, IBAs etc.)		in the whole country. Thus, adverse impact	environment.	
IDAS etc.)		on them is expected, if	environment.	
		the site of power plants		
		and related facilities is		
		located within or close		
		to the area. 2) In		
		addition, hill and		
		mountainous areas are		
		transfer route of		
		transboundary		
		migratory birds		
		between Europe/Asia		
		and Africa. Therefore,		
		there is a possibility of		
		migratory birds striking		
		to		
		transmiision/distributio		
		n line and tower.		
23) Flora,	В	(II, III, IV) 1) In Jordan	(II, III, IV) 1) Distribution	(II, III, IV) To avoid site
Fauna,		there are found many	of site with valuable plant	location within or close to
Ecosystem		precious plant and	and animal species,	distribution areas of valuable
and		animal species as well	ecosystem and biodiversity	plant and animal species, and
Biodiversit		as important areas of	in Jordan and the planned	environmentally sensitive areas.

v		valuable ecosystem and	area. 2) Regulations for	
У		biodiversity. Thus,	conservation of plant,	
		adverse impact on them	animal species and	
		is expected, if the site	biodiversity.	
		of power plants and	biodiversity.	
		related facilities is		
		located within or close		
		to the area. 2) In		
		addition, hill and		
		mountainous areas are		
		transfer route of		
		transboundary		
		migratory birds		
		between Europe/Asia		
		and Africa. Therefore,		
		there is a possibility of		
		migratory birds striking		
		to		
		transmission/distributio		
		n line and tower.		
24)	В	(III) In Jordan cultural	(III) 1) Distribution of site	(III) 1) To avoid site location
Landscape		and heritage sites are	with valuable landscape in	close to existing important
_		distributed in the whole	Jordan and the planned	landscape. 2) Measures to
		country and they	area. 2) Regulation for	harmonize power plants and
		consist of attractive	preserving valuable	related facilities with
		landscape. Thus, there	landscape.	surrounding landscape by design
		is a possibility of		and tree planting in the plan.
		deterioration aesthetic		
		value of landscape by		
		spatial occupancy of		
		transmission/distributio		
		n line and tower.		
25)	С		(II III IV) Matagenala ai - 1	(II III IV) Monitor
25) Micro-clim		(II, III, IV) Most areas of Jordan are	(II, III, IV) Meteorological	(II, III, IV) Monitor
			data in Jordan and planned	micro-climate by meteorological
ate		topographically flat and	area including cases and	data and physical observation.
		occupied by desert.	causes of change in	
		Thus even a small	micro-climate in Jordan	
		change of	and planned area.	
		topographical features		
		such as appearance of		

26) Global	В	new structures and facilities may cause influence to microclimate condition such as wind. However, extent of impact is unknown at present. (II, IV) Generation of	(II, IV) 1) Existing data of	(II, IV) Preventive measures to
Warming		greenhouse gases (GHG) such as CO ₂ and CH ₄ is not expected from operation of transmission/distributio n line. However, generation of GHG is expected from construction vehicles and machines during construction and decommissioning stage. However, extent of emission is not known at present	greenhouse gases emission in Jordan and planned area. 2) Anticipated greenhouse gases emission from construction and decommissioning work.	reduce greenhouse gases emission in construction and decommissioning work.
(3) Environ	mental Po	llution		
27) Air pollution	В	(II, IV) Generation of air pollutants such as dust and NOx are expected due to earth moving and engineering works during construction and decommissioning stage.	(II, IV) 1) Regulation of air pollution including air quality and emission standards. 2) Existing air quality in Jordan and planned area. 3) Anticipated emission of air pollutants from construction and decommissioning work	(II, IV) 1) Preventive measures to control air pollutants emission in construction and decommissioning work. 2) Monitor air pollutants emission and ambient air quality.
28) Water pollution	В	(II, IV) Generation of water pollutants such as SS and BOD is expected due to earth moving and	(II, IV) 1) Regulation of water pollution including water quality and effluent standards. 2) Existing water quality in Jordan and	(II, IV) 1) Preventive measures to control water pollutants discharge in construction and decommissioning work. 2) Monitor water pollutants

		engineering works during construction and decommissioning stage.	planned area. 3) Anticipated discharge of water pollutants from construction and decommissioning work	discharge and environmental water quality.
29) Soil contaminat ion	В	(II, IV) There is a possibility of soil contamination due to leakage of toxic or hazardous materials from construction and decommissioning work. However, features of the contamination is unknown at present.	(II, IV) 1) Regulation of soil contamination. 2) Cases and causes of soil contamination in Jordan and planned area.	(II, IV) 1) Preventive measures to avoid leakage toxic/hazardous materials in construction and decommissioning work. 2) Monitor soil contamination.
30) Bottom sediment	С	(II, IV) In case of power facility is located in coastal area, some impact on coastal conditions is expected due toconstruction and decommissioning work. However, extent of impact is unknown at present.	(II, IV) 1) Regulation of bottom sediment contamination. 2) Cases and causes of bottom sediment contamination.	(II, IV) Monitoring bottom sediment contamination.
31) Soild waste	В	(II, IV) Generation of solid wastes is expected from are expected due to earth moving and engineering works during construction and decommissioning stage.	 (II, IV) 1) Regulation for solid waste management. 2) Existing situation of solid waste management in Jordan and planned area. 3) Anticipated generation of sold waste from construction and decommissioning work. 	(II, IV) 1) Preventive measures for reduction, proper treatment and disposal of solid waste during construction/decommissioning stage in the plan. 2) Reflect concept of 3R (Reduce, reuse and recycle) to the plan. 3) Enlighten awareness of waste management to workers and employees.

32) Noise and Vibration	В	(II, IV) Generation of noise and vibration are expected from are expected due to earth moving and	(II, IV) 1) Regulation of noise and vibration. 2)Generation and ambient level of noise and vibration in Jordan and planned area.	(II, IV) Preventive measures against generation of noise and vibration during operation of power plants and related facilities as well as during
		engineering works during construction and decommissioning stage.	 Anticipated generation of noise and vibration from from construction and decommissioning work. 	construction and decommissioning work.
(4) Permit, 1	Explanatio	on and Others		
Subject			 (T) 1) Methodology of Environmental Impact Assessment in Jordan. 2) Items and Procedures for Permit/Approval. 3) Information disclosure. 4) Stakeholder participation. 5) International Treaties, Agreements, Convention. 	(T) Comparison of AlternativePlans. 2) EnvironmentalManagement Plan,Environmental Monitoring Plan,Emergency Action Plan etc.

Chapter 10 Economic and Financial Analysis

10.1 Project resource statement

Table 10.1 Project resource statement

Investment in 2015

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		0015	0010	0017	0010	0010	0000	0001	0000		0004	0005		0007	0000	0000	0000	0001	0000		nillions of	
Years		2015	2016	2017	2018 3	2019 4	2020 5	2021	2022	2023 8	2024 9	2025	2026	2027	2028	2029	2030 15	2031	2032	2033 18	2034 19	2035 20
Item	Initial			2	5	-		-		0	5	10		12	10	14	10	10	17	10	15	20
	amount																					
A. Investment schedule																	8					0
Construction of distribution facilities	23	23																				
I. Total	23	23																				
B. Working capital	2/12 of the a	innual cost	13														8					0
II. Working capital			13																			-
C. Annual costs	Annual amount																					
Incremental power purchase			70	70	70	69	69	69	69	69	69	69	68	68	68	68	68	68	68	67	67	
Incremental power purchase (GWh)			846	844	843	841	839	837	836	834	832	830	829	827	825	823	822	820	818	817	815	8
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8
O&M (% of the construction cost)	2%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Overhead	10% of the CO	GS	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
III. Total			78	77	77	77	77	77	77	76	76	76	76	76	76	75	75	75	75	75	75	7
D. Benefits	Annual amount											à										
Incremental energy sales			81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	8
Energy sales of the project (GWh)			738	738	738	738	738	738	738	738	738	738	738	738	738	738	738	738	738	738	738	73
Energy sales of the whole system (G	Wh)	18,889	19,626	20,506	21,529	22,606	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,66
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11
Benefit of loss reduction			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Contribution of the project (GWh)			48	46	44	44	44	44	45	45	46	46	47	48	48	49	50	50	51	52	53	5
Total loss reduction (GWh)			48	100	157	219	287	361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,26
Loss reduction achieved (%)			0.2%	0.4%	0.6%	0.7%	0.9%	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5
Distribution loss (%)		13%	12.8%	12.6%	12.4%	12.3%	12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5
IV. Total		2002-000	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	86	8
E. Net benefits																						
IV−I−II−III		-23	-5	8	8	8	8	8	8	9	9	9	9	9	10	10	10	10	10	11	11	2
Discount rate	12%																					
Net present value	30	-23	-5	6	5	5	5	4	4	3	3	3	3	2	2	2	2	2	2	1	1	
Internal rate of return	24%	-23	-4	5	4	3	3	2	2	2	1	1	1	1	- 1	0	0	0	0	0	0	

1/ US\$1 = JD0.708

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(Unit: millions of 2015 USD)

Years		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
lê		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule						s																<u></u>
Construction of distribution facilities	27	27																				
I. Total	27	27																				
B. Working capital	2/12 of the a	innual cost	15			<																<u></u>
II. Working capital			15																			-15
C. Annual costs	Annual amount																					
Incremental power purchase			83	83	83	83	82	82	82	82	82	82	81	81	81	81	81	81	80	80	80	80
Incremental power purchase (GWh)			1,007	1,005	1,003	1,000	998	996	994	992	990	988	986	984	982	980	978	976	974	972	972	972
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Overhead	10% of the CO	GS	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
III. Total			92	92	92	92	91	91	91	91	91	91	90	90	90	90	90	89	89	89	89	89
D. Benefits	Annual amount					81																
Incremental energy sales			97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
Energy sales of the project (GWh)			880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Energy sales of the whole system (0	GWh)	19,626	20,506	21,529	22,606	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Benefit of loss reduction			4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5
Contribution of the project (GWh)			54	52	52	52	53	53	54	55	55	56	57	58	58	59	60	61	62	63	63	63
Total loss reduction (GWh)			100	157	219	287	361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264
Loss reduction achieved (%)			0.4%	0.6%	0.7%	0.9%	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%
Distribution loss (%)		12.8%	12.6%	12.4%	12.3%	12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%
IV. Total			101	101	101	101	101	101	101	101	101	101	102	102	102	102	102	102	102	102	102	102
E. Net benefits		_																				
IV-I-II-III		-27	-6	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13	13	13	28
Discount rate	12%																					
Net present value	37	-27	-6	7	7	6	6	5	5	4	4	4	3	3	3	2	2	2	2	2	2	3
Internal rate of return	24%	-27	-5	6	5	4	3	3	2	2	2	1	1	1	-1	1	0	0	0	0	0	0

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	203
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	32	32																				
. Total	32	32																				
3. Working capital	2/12 of the a	nnual cost	18																			
I. Working capital			18																			
C. Annual costs	Annual amount																					
Incremental power purchase			97	96	96	96	96	95	95	95	95	95	95	94	94	94	94	94	93	93	93	
Incremental power purchase (GWh))		1,168	1,165	1,163	1,160	1,158	1,156	1,153	1,151	1,148	1,146	1,144	1,141	1,139	1,137	1,134	1,132	1,130	1,130	1,130	
Shadow price (2015 US¢/kWh)	JD0.047 as of	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
II. Total	1 1		107	107	107	106	106	106	106	105	105	105	105	105	104	104	104	104	104	104	104	
D. Benefits	Annual amount					3																
Incremental energy sales			113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	
Energy sales of the project (GWh)			1,022	1.022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022	
Energy sales of the whole system ((GWh)	20,506	21,529	22,606	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	. 5
Shadow price (2015 US¢/kWh)	JD0.063 as of	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction	1		5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	
Contribution of the project (GWh)			61	60	61	61	62	63	64	64	65	66	67	68	69	70	71	72	73	73	73	
Total loss reduction (GWh)			157	219	287	361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	
Loss reduction achieved (%)			0.6%	0.7%	0.9%	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	1
Distribution loss (%)		12.6%	12.4%	12.3%	12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	
V. Total		0.000	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	119	119	119	
E. Net benefits																						
V–I–II–III		-32	-7	11	11	11	12	12	12	12	13	13	13	14	14	14	14	15	15	15	15	
Discount rate	12%																					
Net present value	45	-32	-6	9	8	7	7	6	5	5	5	4	4	3	3	3	3	2	2	2	2	
Internal rate of return	25%	-32	-6	7	6	5	4	3	3	2	2	2	1	1	1	1	1	0	0	0	0	

1/ US\$1 = JD0.708

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(Unit: millions of 2015 USD)

Years		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2015 USD)
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	33	33																				
I. Total	33	33																				
B. Working capital	2/12 of the a	nnual cost	19			· · · · · · · · · · · · · · · · · · ·			2			:										<u></u>
II. Working capital			19									5										-19
C. Annual costs	Annual amount																					
Incremental power purchase			101	101	101	101	101	100	100	100	100	100	99	99	99	99	99	98	98	98	98	98
Incremental power purchase (GWh)			1,227	1,225	1,222	1,220	1,217	1,215	1,212	1,209	1,207	1,204	1,202	1,199	1,197	1,195	1,192	1,190	1,190	1,190	1,190	1,190
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Overhead	10% of the CO	3S	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
III. Total			112	112	112	112	111	111	111	111	111	110	110	110	110	109	109	109	109	109	109	109
D. Benefits	Annual amount					c)						4										
Incremental energy sales			119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
Energy sales of the project (GWh)			1,077	1.077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1.077
Energy sales of the whole system (C	GWh)	21,529	22,606	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Benefit of loss reduction			5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Contribution of the project (GWh)			64	64	64	65	66	67	68	69	70	70	71	72	73	74	76	77	77	77	77	77
Total loss reduction (GWh)			219	287	361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264
Loss reduction achieved (%)			0.7%	0.9%	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%
Distribution loss (%)		12.4%	12.3%	12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%
IV. Total		00000000	124	124	124	124	124	124	124	124	124	124	124	125	125	125	125	125	125	125	125	125
E. Net benefits																						
IV−I−II−III		-33	-7	12	12	12	12	13	13	13	14	14	14	15	15	15	16	16	16	16	16	35
Discount rate	12%																					
Net present value	50	-33	-7	9	8	8	7	6	6	5	5	5	4	4	3	3	3	3	2	2	2	4
Internal rate of return	26%	-33	-6	8	6	5	4	4	3	2	2	2	1	1	1	1	1	1	0	0	0	0

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
10162-0016-0016		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule Construction of distribution facilities I. Total	35																					5
B. Working capital	2/12 of the a	1.0000	20					-														-
II. Working capital	2000/2000/060200	1112,5453 (0,0.353	20																			
C. Annual costs	Annual amount																					
Incremental power purchase			106	106	106	106	105	105	105	105	104	104	104	104	104	103	103	103	103	103	103	
Incremental power purchase (GWh	n)		1,285	1,282	1,280	1,277	1,274	1,272	1,269	1,266	1,264	1,261	1,259	1,256	1,253	1,251	1,248	1,248	1,248	1,248	1,248	1
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	
III. Total			118	117	117	117	117	116	116	116	116	116	115	115	115	115	114	114	114	114	114	
D. Benefits	Annual amount																					
Incremental energy sales			124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	
Energy sales of the project (GWh)	E.		1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,130	
Energy sales of the whole system	(GWh)	22,606	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction			6	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	
Contribution of the project (GWh)	6		67	68	68	69	70	71	72	73	74	75	76	77	78	79	81	81	81	81	81	
Total loss reduction (GWh)			287	361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	3
Loss reduction achieved (%)			0.9%	1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		12.3%	12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total			130	130	130	130	130	130	130	130	130	131	131	131	131	131	131	131	131	131	131	
E. Net benefits																						·
IV-I-II-III		-35	-7	13	13	13	13	14	14	14	15	15	15	16	16	16	17	17	17	17	17	_
Discount rate	12%																					
Net present value	54	-35	-7	10	9	8	8	7	6	6	5	5	4	4	4	3	3	3	2	2	2	
Internal rate of return	26%	-35	-6	8	7	6	5	4	3	3	2	2	1	1	ा (1	1.	1	0	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
-		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	37	37																				
I. Total	37	37																				
B. Working capital	2/12 of the a	annual cost	21																			
II. Working capital			21																			2
C. Annual costs	Annual amount																					
Incremental power purchase			111	111	111	111	111	110	110	110	110	109	109	109	109	108	108	108	108	108	108	
Incremental power purchase (GWh)			1,349	1,346	1,343	1,340	1,338	1,335	1,332	1,329	1,327	1,324	1,321	1,318	1,316	1,313	1,313	1,313	1,313	1,313	1,313	1
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	ĠS	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
III. Total			124	123	123	123	123	122	122	122	121	121	121	121	121	120	120	120	120	120	120	
D. Benefits	Annual amount																					
Incremental energy sales			131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	131	
Energy sales of the project (GWh)			1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1,188	1
Energy sales of the whole system (C	GWh)	23,735	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	
Contribution of the project (GWh)			71	72	73	74	75	76	77	78	79	80	81	82	83	85	85	85	85	85	85	
Total loss reduction (GWh)			361	442	530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2
Loss reduction achieved (%)			1.1%	1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		12.1%	11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total		00000000	137	137	137	137	137	137	137	137	137	137	138	138	138	138	138	138	138	138	138	
E. Net benefits																						
IV-I-II-III		-37	-7	13	14	14	14	15	15	15	16	16	16	17	17	18	18	18	18	18	18	
Discount rate	12%																					
Net present value	60	-37	-7	11	10	9	8	8	7	6	6	5	5	4	4	4	3	3	3	2	2	
Internal rate of return	27%	-37	-6	9	7	6	5	4	3	3	2	2	2	1	1	1	1	1	0	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	40	40																				
I. Total	40	40																				
B. Working capital	2/12 of the a	nnual cost	22				1															
II. Working capital			22																			-2
C. Annual costs	Annual amount																					
Incremental power purchase			120	120	120	119	119	119	119	118	118	118	118	117	117	117	117	117	117	117	117	11
Incremental power purchase (GWh)			1,452	1,449	1,446	1,443	1,440	1,437	1,434	1,431	1,428	1,425	1,422	1,419	1,417	1,417	1,417	1,417	1,417	1,417	1,417	1,41
Shadow price (2015 US¢/kWh)	JD0.047 as of	F 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	as	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	1:
III. Total	1		133	133	132	132	132	132	131	131	131	131	130	130	130	130	130	130	130	130	130	13
D. Benefits	Annual amount																					
Incremental energy sales			141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	14
Energy sales of the project (GWh)			1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282
Energy sales of the whole system (G	Wh)	24,924	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,66
Shadow price (2015 USc/kWh)	JD0.063 as of	F 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Benefit of loss reduction	1		6	6	7	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	1
Contribution of the project (GWh)			78	79	80	81	82	83	84	85	86	87	89	90	91	91	91	91	91	91	91	91
Total loss reduction (GWh)			442	530	626	731	844	971	1,110	1,262	1,429	1.611	1,809	2.026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264
Loss reduction achieved (%)			1.3%	1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5
Distribution loss (%)		11.9%	11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5
IV. Total			148	148	148	148	148	148	148	148	148	148	148	149	149	149	149	149	149	149	149	14
E. Net benefits																						,
IV-I-II-III		-40	-8	15	15	16	16	16	17	17	17	18	18	19	19	19	19	19	19	19	19	4
Discount rate	12%																					
Net present value	67	-40	-7	12	11	10	9	8	8	7	6	6	5	5	4	4	3	3	3	2	2	3
Internal rate of return	28%	-40	-6	10	8	7	5	4	4	3	2	2	2	1	1	1	1	1	0	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
	10	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule Construction of distribution facilities	41	41																				0
I. Total	41	41																				
B. Working capital	2/12 of the a	innual cost	23						2													°
II. Working capital			23																			
C. Annual costs	Annual amount																					
Incremental power purchase			124	124	123	123	123	123	122	122	122	122	121	121	121	121	121	121	121	121	121	
Incremental power purchase (GWh)			1,500	1,497	1,494	1,491	1,487	1,484	1,481	1,478	1,475	1,472	1,469	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	13	13	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
III. Total			137	137	137	137	136	136	136	135	135	135	135	134	134	134	134	134	134	134	134	
D. Benefits	Annual amount					c)																
Incremental energy sales			146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	
Energy sales of the project (GWh)			1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1
Energy sales of the whole system (0	GWh)	26,206	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	
Contribution of the project (GWh)			81	82	84	85	86	87	88	89	90	92	93	95	95	95	95	95	95	95	95	
Total loss reduction (GWh)			530	626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2.
Loss reduction achieved (%)			1.5%	1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		11.7%	11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total			153	153	153	153	153	153	153	153	154	154	154	154	154	154	154	154	154	154	154	
E. Net benefits																						
IV–I–II–III		-41	-7	16	16	17	17	17	18	18	18	19	19	20	20	20	20	20	20	20	20	
Discount rate	12%																					
Net present value	71	-41	-7	13	12	11	10	9	8	7	7	6	6	5	4	4	4	3	3	3	2	
Internal rate of return	28%	-41	-6	10	8	7	6	5	4	3	3	2	2	1	1	1	1	1	0	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

																						2015 USD
Years		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
lá	. <u> </u>	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule	Î					<			×													Ĩ
Construction of distribution facilities	44	44																				
I. Total	44	44																				
B. Working capital	2/12 of the a	innual cost	25						e								8 8					°
II. Working capital			25																			-2
C. Annual costs	Annual amount																					
Incremental power purchase			134	133	133	133	133	132	132	132	131	131	131	131	131	131	131	131	131	131	131	1:
Incremental power purchase (GWh)			1,617	1,614	1,611	1,607	1,604	1,601	1,597	1,594	1,591	1,587	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,584	1,58
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	3
III. Total			148	148	147	147	147	147	146	146	146	145	145	145	145	145	145	145	145	145	145	14
D. Benefits	Annual amount																					2
Incremental energy sales			158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	15
Energy sales of the project (GWh)			1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,43
Energy sales of the whole system (G	Wh)	27,533	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,6
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11
Benefit of loss reduction			7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Contribution of the project (GWh)			89	90	92	93	94	95	96	98	99	101	102	102	102	102	102	102	102	102	102	10
Total loss reduction (GWh)			626	731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,26
Loss reduction achieved (%)			1.7%	1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.
Distribution loss (%)		11.5%	11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5
IV. Total		20,100200	165	165	165	165	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	16
E. Net benefits									· · · · ·													[
IV-I-II-III		-44	-8	18	18	18	19	19	20	20	20	21	21	21	21	21	21	21	21	21	21	4
Discount rate	12%																					
Net present value	80	-44	-7	14	13	12	11	10	9	8	7	7	6	5	5	4	4	3	3	3	2	
Internal rate of return	29%	-44	-6	11	9	8	6	5	4	4	3	2	2	2	1	1	1	1	1	0	0	l.

1/ US\$1 = JD0.708

2/ CGS: Cost of goods sold

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(Unit: millions of 2015 USD)

Years		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
, cars		0	1	2020	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	2044
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	47	47																				
I. Total	47	47																				
B. Working capital	2/12 of the a	annual cost	26			· · · · · ·																
II. Working capital			26																			-
C. Annual costs	Annual amount																					
Incremental power purchase			143	142	142	142	141	141	141	140	140	140	140	140	140	140	140	140	140	140	140	1
Incremental power purchase (GWh)			1,725	1,721	1,718	1,714	1,711	1,707	1,703	1,700	1,696	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,693	1,6
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	1
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the Co	GS	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	
III. Total			158	158	157	157	157	156	156	156	155	155	155	155	155	155	155	155	155	155	155	1
D. Benefits	Annual amount													8								5
Incremental energy sales			169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	1
Energy sales of the project (GWh)			1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,532	1,5
Energy sales of the whole system (C	GWh)	28,967	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,6
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	1
Benefit of loss reduction			8	8	8	8	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
Contribution of the project (GWh)			96	98	99	100	102	103	104	106	108	109	109	109	109	109	109	109	109	109	109	1
Total loss reduction (GWh)			731	844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,2
Loss reduction achieved (%)			1.9%	2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3
Distribution loss (%)		11.3%	11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9
IV. Total		20,129-529	177	177	177	177	177	177	177	177	178	178	178	178	178	178	178	178	178	178	178	1
E. Net benefits						·																
IV−I−II−III		-47	-8	19	20	20	20	21	21	22	22	23	23	23	23	23	23	23	23	23	23	
Discount rate	12%																					
Net present value	88	-47	-7	15	14	13	12	11	10	9	8	7	7	6	5	5	4	4	3	3	3	
Internal rate of return	30%	-47	-6	12	10	8	7	6	5	4	3	3	2	2	1	1	1	1	1	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
tem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	49	49																				
I. Total	49	49																				
3. Working capital	2/12 of the a	nnual cost	27												1							
II. Working capital			27																			-
C. Annual costs	Annual amount																					
Incremental power purchase			148	148	148	147	147	147	146	146	146	146	146	146	146	146	146	146	146	146	146	1
Incremental power purchase (GWh)			1,793	1,790	1,786	1,782	1,778	1,775	1,771	1,768	1,764	1,764	1,764	1,764	1,764	1,764	1,764	1,764	1,764	1,764	1,764	1,7
Shadow price (2015 US¢/kWh)	JD0.047 as of	2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	1
O&M (% of the construction cost)	2%		1	1	1	1	- 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	S	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
III. Total			164	164	164	163	163	163	162	162	162	162	162	162	162	162	162	162	162	162	162	1
D. Benefits	Annual amount																					
Incremental energy sales			176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	1
Energy sales of the project (GWh)			1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,5
Energy sales of the whole system (G	GWh)	30,500	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,6
Shadow price (2015 US¢/kWh)	JD0.063 as of	2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	1
Benefit of loss reduction	1 1		8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
Contribution of the project (GWh)			102	103	104	106	107	109	110	112	114	114	114	114	114	114	114	114	114	114	114	1
Total loss reduction (GWh)			844	971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,2
Loss reduction achieved (%)			2.0%	2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.
Distribution loss (%)		11.1%	11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.
IV. Total			184	184	184	184	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	1
E. Net benefits																						
IV-I-II-III		-49	-7	20	21	21	22	22	23	23	24	24	24	24	24	24	24	24	24	24	24	
Discount rate	12%																					
Net present value	94	-49	-7	16	15	14	12	11	10	9	9	8	7	6	5	5	4	4	3	3	3	
Internal rate of return	30%	-49	-6	13	11	9	7	6	5	4	3	3	2	2	1	1	1	1	1	0	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule Construction of distribution facilities I. Total	56 56			0					×													
B. Working capital	2/12 of the a	005.50	31																			
II. Working capital	2/12 01 010 0		31																			
C. Annual costs	Annual amount																					
Incremental power purchase			169	168	168	168	167	167	167	166	166	166	166	166	166	166	166	166	166	166	166	
Incremental power purchase (GWh)			2,043	2,039	2,035	2,030	2,026	2,022	2,018	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2,014	2
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	
III. Total			187	187	186	186	186	185	185	184	184	184	184	184	184	184	184	184	184	184	184	
D. Benefits	Annual amount											0										
Incremental energy sales			201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201	
Energy sales of the project (GWh)			1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	1,823	
Energy sales of the whole system (C	GWh)	32,096	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	5
Shadow price (2015 US¢/kWh)	JD0.063 as of	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	1
Contribution of the project (GWh)			118	119	121	122	124	126	128	130	130	130	130	130	130	130	130	130	130	130	130	1
Total loss reduction (GWh)			971	1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	
Loss reduction achieved (%)			2.2%	2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	1
Distribution loss (%)		11.0%	10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	1
IV. Total			210	210	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	1
E. Net benefits															1	1						
IV-I-II-III		-56	-8	24	24	25	25	26	26	27	27	27	27	27	27	27	27	27	27	27	27	
Discount rate	12%																					
Net present value	110	-56	-7	19	17	16	14	13	12	11	10	9	8	7	6	6	5	4	4	4	3	
Internal rate of return	31%	-56	-6	15	13	10	9	7	6	5	4	3	3	2	2	1	1	1	1	1	0	L

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	204
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule Construction of distribution facilities I. Total	60 60	60 60																				
B. Working capital	2/12 of the a	5,57,62	33					-														
II. Working capital		11111111111111	33																			
C. Annual costs	Annual amount																					
Incremental power purchase			180	180	179	179	179	178	178	178	178	178	178	178	178	178	178	178	178	178	178	
Incremental power purchase (GWh)			2,180	2,175	2,171	2,166	2,162	2,158	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	2,153	
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	
III. Total			200	199	199	198	198	198	197	197	197	197	197	197	197	197	197	197	197	197	197	
D. Benefits	Annual amount																					
Incremental energy sales			215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	
Energy sales of the project (GWh)			1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	1,949	
Energy sales of the whole system (GWh)	33,919	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	1
Shadow price (2015 US¢/kWh)	JD0.063 as of	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction			11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
Contribution of the project (GWh)			127	129	131	133	135	137	139	139	139	139	139	139	139	139	139	139	139	139	139	
Total loss reduction (GWh)			1,110	1,262	1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	
Loss reduction achieved (%)			2.4%	2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		10.8%	10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total			225	225	225	225	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	
E. Net benefits																						
IV−I−II−III		-60	-8	26	27	27	28	28	29	29	29	29	29	29	29	29	29	29	29	29	29	
Discount rate	12%																					
Net present value	120	-60	-7	21	19	17	16	14	13	12	10	9	8	7	7	6	5	5	4	4	3	
Internal rate of return	31%	-60	-6	17	14	11	9	8	6	5	4	3	3	2	2	1	1	1	1	1	0	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
18		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	64	64																				
I. Total	64	64																				
B. Working capital	2/12 of the a	annual cost	35						2						1							
II. Working capital			35																			
C. Annual costs	Annual amount																					
Incremental power purchase			192	192	191	191	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	
Incremental power purchase (GWh)			2,323	2,318	2,313	2,308	2,304	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2,299	2
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	
III. Total			213	212	212	211	211	210	210	210	210	210	210	210	210	210	210	210	210	210	210	
D. Benefits	Annual amount			39 								0) I								
Incremental energy sales			229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	
Energy sales of the project (GWh)			2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	2,081	3
Energy sales of the whole system (C	GWh)	35,868	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	5
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
Contribution of the project (GWh)			138	140	142	144	146	148	148	148	148	148	148	148	148	148	148	148	148	148	148	
Total loss reduction (GWh)			1,262	1,429	1,611	1,809	2.026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	3
Loss reduction achieved (%)			2.6%	2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		10.6%	10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total		12366-2223	240	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	241	
E. Net benefits															1							
IV−I−II−III		-64	-8	28	29	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
Discount rate	12%																					
Net present value	131	-64	-7	23	21	19	17	16	14	12	11	10	9	8	7	6	6	5	4	4	4	
Internal rate of return	32%	-64	-6	18	15	12	10	8	7	5	4	4	3	2	2	1	1	1	1	1	1	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Item	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	69	69																				
I. Total	69	69																				
B. Working capital	2/12 of the a	annual cost	38																			í –
II. Working capital			38																			
C. Annual costs	Annual amount																					
Incremental power purchase			205	204	204	204	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	
Incremental power purchase (GWh)			2,480	2,475	2,470	2,465	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,459	2,4
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	
III. Total			227	227	226	226	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	
D. Benefits	Annual amount																					
Incremental energy sales			245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	
Energy sales of the project (GWh)			2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2
Energy sales of the whole system (C	GWh)	37,949	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	12	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
Contribution of the project (GWh)			149	152	154	156	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	
Total loss reduction (GWh)			1,429	1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2
Loss reduction achieved (%)			2.8%	3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		10.4%	10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total		1000000	257	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	258	
E. Net benefits																						
IV−I−II−III		-69	-7	31	32	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	
Discount rate	12%																					
Net present value	142	-69	-7	25	23	21	19	17	15	13	12	11	9	8	8	7	6	5	5	4	4	
Internal rate of return	33%	-69	-6	20	17	14	11	9	7	6	5	4	3	2	2	2	1	1	1	1	1	

1/ US\$1 = JD0.708

(Unit: millions of 2015 USD)

Years		2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						
Construction of distribution facilities	73	73																				
I. Total	73	73																				
B. Working capital	2/12 of the a	innual cost	40						2													
II. Working capital			40																			
C. Annual costs	Annual amount																					
Incremental power purchase			217	217	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	
Incremental power purchase (GWh)			2,629	2,624	2,619	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,613	2,
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Overhead	10% of the CO	GS	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
III. Total			241	240	240	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	
D. Benefits	Annual amount																					
Incremental energy sales			260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	
Energy sales of the project (GWh)			2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2,365	2
Energy sales of the whole system (C	GWh)	40,176	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50
Shadow price (2015 USc/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction			13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	
Contribution of the project (GWh)			161	163	166	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	
Total loss reduction (GWh)			1,611	1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2
Loss reduction achieved (%)			3.0%	3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		10.2%	10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total		725362565	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	
E. Net benefits																						
IV−I−II−III		-73	-7	34	34	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	
Discount rate	12%																					
Net present value	154	-73	-6	27	24	22	20	18	16	14	13	11	10	9	8	7	6	6	5	5	4	
Internal rate of return	33%	-73	-6	22	18	15	12	10	8	6	5	4	3	3	2	2	1	1	1	1	1	

1/ US\$1 = JD0.708

Years		2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	205
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																						0
Construction of distribution facilities	78	78																				
I. Total	78	78																				
B. Working capital	2/12 of the a	annual cost	43																			
II. Working capital			43																			
C. Annual costs	Annual amount																					
Incremental power purchase			232	232	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	
Incremental power purchase (GWh)			2,809	2,803	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	
O&M (% of the construction cost)	2%		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Overhead	10% of the CO	ĠS	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
III. Total			257	257	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	
D. Benefits	Annual amount			-1								0										
Incremental energy sales			279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	279	
Energy sales of the project (GWh)			2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	2,532	
Energy sales of the whole system (GWh)	42,541	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	
Shadow price (2015 US¢/kWh)	JD0.063 as o	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Benefit of loss reduction		1	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
Contribution of the project (GWh)			175	178	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	
Total loss reduction (GWh)			1,809	2,026	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	
Loss reduction achieved (%)			3.1%	3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	
Distribution loss (%)		10.0%	9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	
IV. Total		12346-2223	293	293	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	294	
E. Net benefits																						
IV-I-II-III		-78	-7	37	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	
Discount rate	12%																					
Net present value	166	-78	-6	29	27	24	21	19	17	15	14	12	11	10	9	8	7	6	5	5	4	
Internal rate of return	33%	-78	-6	24	20	16	13	10	8	7	5	4	3	3	2	2	1	1	1	1	1	

1/ US\$1 = JD0.708

2/ CGS: Cost of goods sold

(Unit: millions of 2015 USD)

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(Unit: millions of 2015 USD)

Years		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2015 050
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																	-					
Construction of distribution facilities	83	83																				
I. Total	83	83																				
B. Working capital	2/12 of the a	nnual cost	46																			
II. Working capital			46																			-4
C. Annual costs	Annual amount																					
Incremental power purchase			247	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	24
Incremental power purchase (GWh)			2,986	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,980	2,98
Shadow price (2015 US¢/kWh)	JD0.047 as of	2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.
O&M (% of the construction cost)	2%		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Overhead	10% of the CO	S	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	2
III. Total	1		273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	273	27
D. Benefits	Annual amount																					,
Incremental energy sales			297	297	297	297	297	297	297	297	297	297	297	297	297	297	297	297	297	297	297	29
Energy sales of the project (GWh)			2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2.697	2,697	2,697	2,697	2,697	2,697	2,69
Energy sales of the whole system (G	Wh)	45,073	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,66
Shadow price (2015 US¢/kWh)	JD0.063 as of	2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.
Benefit of loss reduction	l i		16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	1
Contribution of the project (GWh)			189	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	19
Total loss reduction (GWh)			2,026	2,264	2,264	2,264	2.264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,26
Loss reduction achieved (%)			3.3%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5
Distribution loss (%)		9.9%	9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5
IV. Total			313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	31
E. Net benefits																						
IV−I−III−III		-83	-6	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	8
Discount rate	12%																					
Net present value	179	-83	-6	32	28	25	23	20	18	16	14	13	11	10	9	8	7	7	6	5	5	
Internal rate of return	34%	-83	-5	26	21	17	14	11	9	7	6	5	4	3	2	2	2	1	1	1	1	

1/ US\$1 = JD0.708

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(Unit: millions of 2015 USD)

Years		2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2015 050/
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ltem	Initial amount																					
A. Investment schedule																	8 8					
Construction of distribution facilities	89	89																				
I. Total	89	89																				
B. Working capital	2/12 of the a	innual cost	49																			2
II. Working capital			49																			-49
C. Annual costs	Annual amount																					
Incremental power purchase			264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
Incremental power purchase (GWh)			3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Shadow price (2015 US¢/kWh)	JD0.047 as o	f 2010	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
O&M (% of the construction cost)	2%		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Overhead	10% of the CO	GS	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
III. Total			293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293
D. Benefits	Annual amount																					
Incremental energy sales			319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319	319
Energy sales of the project (GWh)			2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897	2,897
Energy sales of the whole system (G	GWh)	47,771	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667	50,667
Shadow price (2015 US¢/kWh)	JD0.063 as of	f 2010	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Benefit of loss reduction			17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Contribution of the project (GWh)			206	206	206	206	206	206	206	206	206	206	206	206	206	206	206	206	206	206	206	206
Total loss reduction (GWh)			2,264	2,264	2,264	2,264	2.264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264	2,264
Loss reduction achieved (%)			3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Distribution loss (%)		9.7%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
IV. Total			336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336	336
E. Net benefits																						
IV-I-II-III		-89	-6	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	92
Discount rate	12%																					
Net present value	193	-89	-5	34	31	27	24	22	19	17	15	14	12	11	10	9	8	7	6	6	5	10
Internal rate of return	34%	-89	-5	28	22	18	15	12	9	8	6	5	4	3	3	2	2	1	1	1	1	1

1/ US\$1 = JD0.708