### 付属資料

- 付属資料 A : Generating Plants
- 付属資料 B : Demand Forecast
- 付属資料 C : Generation Expansion Plan
- 付属資料 D : Standards related to the Electricity Sector
- 付属資料 E : Specific Features of Thermal Plant
- 付属資料 F : Items to be Considered for Selection of New Generating Plant
- 付属資料G : Power Network Diagram for the Power Flow Calculation

### 付属資料 A : Generating Plants

Sheet No.

Type: THS			Ref.	No.	: T-1		Sourc	ce o	of In	format	ion	: EN	JAR/CPA	L	
Name of Po	wer Pl	ant	Dibs	s TPS	S		Powe	er S	tati	on ID:					
It	ems								D	escript	ions	s			
Location			Gov	erno	rate	City							Coordin	nates	•
			Т	ame	em	Ki	irkuk		N	:				E:	
	Unit No.	Year Comn sionin	of 1 nis o	Nan capa (M	neplate city W)	Dera capa (M	ated acity W)		No. yea	rs i ration	of n	Rea Rea	ason of D cords babilitati	eration of	ing. Renewal ,
Unit	1	195	9	(111	15	(111	5		ope	44		(1)I	Due to th	$\frac{1011}{10}$	culating water
Data	2	195	9		15		10			44		sys	stem pum The lack	nps. of s	snare narts for
	3	195	9		15		10			44		rou	tine me	unte	nance, choked
	4	195	9		15		10			44		cor ove	ndenser er-age for	tub all t	es, and the he units.
												3	only	tw	o generator
												tra liei	nsformer 1 of the o	rs, 25 rigin	5 MVA each, in al four.
Total of plant	4				60		35					-		8	
Production		Maxim	um	I	Annual	en	nergy	St	atio	n use		Sta	tion tota	ıl effi	ciency(%)
Record in 2	002	power	(	I	product	tion (k	Wh)	en	erg	y(kWh	1)	At	Gen.Terr	n.	At Trans.Term.
		output	(MW)	)	150	057.00	0	1	0.01	== 000	_				
Fuel		Dogion	40 T	200	156,	U57,00			12,2	55,000 Fuol		Fu	ol troot		Fuel storego
ruei		Design	N	G.		Fuer	Type		110. 1	ruer		ru	ei treat.		Fuel storage
		Gas Co	ntent	& C	alory (1	Lower)		C	Dil (	Charact	teri	stics	s & Calor	.y (	Lower)
		(17.Jan	nbour	Sou	th Gas	)								-	
Boiler		Main stream press.(I	MPa)	M St (d	ain/Re ceam Te eg.C/de	heat emp. eg/C)	Stea capa (t/h)	am acit	y	Boiler	r Ty	pe	Manufa urer	act-	Feed water treatment
										MA	٩N				
Steam Turk	oine	Type (t or cross	anden s comp	n 5.)	Revo (rpm	lution )	Man	nufa	actu	rer	Co	ooliı	ng water	S	steam Extract.
Flast is al	0				C		MAI	N					El	1 .	
Control	æ	Canaci	tv(MV	Υ <u>Α</u> )	Powe	erator	Mar	nife	actu	rer	El	lecti	rical		Control System
Control		Capaci			facto	r	Mai			101	Μ	anu	lfacturer		,
				М	lain Tra	ansforr	ner						Grid	Con	nection
		Capaci	ty(MV	A)	Volta	ge(kV)	T	ype	è		Sv	witc	hgear	V	/oltage(kV)
Main Probl Action Plan Restoration Improveme	ems, is for is & ent	(ENA tec con tw	R) :It chnica nplete enty y	; is u lly a e reh ears	nlikely nd ecor abilita and re	that p nomica tion, w educe t	artial 1 lly just hich ca he oper	reh tifie an e rati	abil ed. F exter ion a	itation Howeve nd the and ma	of t er, r life aint	this reno of t ena	power st vation ar he plant nce cost,	ation nd me by an will	n will be odernization or nother fifteen to be beneficial.

Note:

PREPARATORY WORK FOR THE MASTER PLAN OF ELECTRICITY SECTOR

Type: TPS			Ref. 1	No. T	<sup>2</sup> 2		Sour	ce c	f Informat	tion:	EN	AR/CPA		
Name of Po	ower P	lant	Baji	TPS			Powe	er S	tation ID:					
It	ems								Descript	ions				
Location			Gove	ernora	ate	City						Coordina	tes	
			Sala	h al-I	Din	Baji			N:			Ι	<u> </u>	
	Unit	Year	of 1	Vame	plate	Dera	ated		No.	of	Rea	ison of Der	rati	ng.
	No.	Comn	nis c	apaci (MW	ity 7)	capa Poal	city z (M	V)	years i	n ]	Rec Rok	ords o abilitation	of 2 or	Renewal ,
Unit	1	198	3	22	20	1 ear	110	()	20		(EN	IADIIItation JAR):	1 ar	lu etc.
Data	2	198	3	22	20		110		20	1	Det	eriorated	t t	urbine rotors,
	3	1984	4	22	20		110		19	]	cnii leal	nney 1 xage), lack	rei	sufficient water
	4	1984	4	22	20		110		19	1	trea hyd	tment ch razine, ខ	iem and	circumscribed
	5	1984	4	22	20		0		19	(	out	put from t	he	water treatment
	6	198-	4	22	20		110		19		pia	110.		
Total of plant	6			1,3	20		550							
Production		Maxim	um	Ar	nnual	en	ergy	St	ation use	5	Sta	tion total e	effic	ciency(%)
Record in 2	002	power		$\mathbf{pr}$	oducti	ion (k	Wh)	en	ergy(kWh	n)	At (	Gen.Term.		At Trans.Term.
		output	(MW)											
		76	35		4,644	,673,00	00	3	83,247,020	)				
Fuel		Design		Тур	be	Fue	l Type	A	Alt. Fuel		F	uel treat.		Fuel storage
				Fuel	Oil				Gas					
		Gas Co	ntent	& Cal	lory(L	ower)		(	Oil Charac	teris	tics	& Calory	(Lo	ower)
		(12.Sa	alah Al	-Den	Refin	ery)	- ~							
Boiler		Main stream		Ma: Ste	in/Reł am Te	neat	Stea	am acit	Boiler	r Typ	be	Manufact	t-	Feed water
		press.(1	MPa)	(deg	g.C/de	g/C)	(t/h)	)	5			uror		troutmont
												Ansalde	0	
Steam Turk	oine	Type (t	andem	or	Revol	ution	Mai	nufa	acturer	Co	olin	g water	St	team Extract.
		cross co	Jiip./		(rpm)			An	saldo					
Electrical	&				Gene	rator		1 111	Sardo			Electrics	al &	Control
Control	a	Canaci	tv(MV	4)	Powe	r	Mai	nuf	acturer	Ele	ectr	ical	C	ontrol System
		cuputi	05 (112 11		factor	ſ				Ma	anu	facturer		-
				Ma	in Tra	insforn	ner					Grid C	'oni	nection
		Capaci	ty(MV	<u>A)</u>	Volta	ge(kV)	Т	урє	•	Sw	vitcl	ngear	Ve	oltage(kV)
Main Probl Action Plar Restoration Improveme	ems, 1s for 1s & ent	(ENAR An exp	) losion	in Un	nit 5 b	oiler h	as put	; thi	s unit out	servi	ice	since Mar.	200	03.
		CPA: u by U	ınder r SAID/	ehabi Becht	ilitatio zel ,cor	on on U nplete	Jnit 1, 01-Ju	,2,3 in-0	,4, <b>&amp;</b> 6: Rea 4	lized	l ad	ditional po	owe	r: 100MW:

Type: TPS			Ref. 1	No. T-3		Sour	ce o	f Informati	on: ]	ENAR/CPA	1	
Name of Po	ower P	lant	]	Doura TF	S	Powe	er St	tation ID:				
It	ems					L		Descriptio	ons			
Location			Gove	rnorate	City					Coordina	ites	
			Ba	ighdad				N:			E:	
	Unit	Year	of N	Vameplat	e Der	ated		No. of	f Re	ason of De	rati	ng.
	No.	sionin	nis c	(MW)	capa (N	acıty IW)		operation	Re	cords ( habilitatio	of n ar	Renewal , nd etc.
Unit	3	198	8	160		102		15	(E	NAR) the l	ack	of spare parts
Data	4	198	8	160		102		15	for de	routine m fective boil	aint er ti	tenance, ubes and control
	5	197	8	160		131		25	an	d instrume	ent s	system
	6	198	3	160		131		20				
Total of plant	4			640		466						
Production		Maxim	um	Annua	d er	nergy	Sta	ation use	Sta	ation total	effic	ciency (%)
Record in 2	002	power		produ	ction (k	(Wh	en	ergy(kWh)	At	Gen.Term		At Trans.Term.
		output	(MW)						_			
		52	28	2,06	60,656,0	00	т.					
Fuel		Design	Ty		Fuel	Туре	A	lt. Fuel	Fu	iel treat.		Fuel storage
		Cas Ca	F	uel Oil	(T arms	FO		Gas		e 8 Calana		(1
		Gas Co	O;1/M	x Calory	(Lowe	r)		u Characte	eristic	s & Calory		(Lower)
Boiler		Main	011/11	Main/R	eheat	Stea	am	Boiler'	Type	Manufac	t-	Feed water
Doner		stream		Steam '	Temp.	cap	acity	7		urer		treatment
		press.(1 13.	<u>мРа)</u> З	(deg.C/d	1eg/C) 535	(t/n)	)			Ansald	0	
Steam Turł	oine	Type (t	andem	Rev	olution	Mar	nufa	cturer	Coo	ling	S	team Extract.
		or cross	s comp	.) (rpr	n)				wat	er		
	0					Tos	hiba	/Siemens				
Electrical	&	0		Ge	nerator	M.			Elec	Electric	al d	& Control Control System
Control		Capacr	ty(IVI V/	fact	or	mai	nuta	cturer	Mar	nufacturer		Control System
						Ans	saldo	/Siemens				
				Main 7	ransfor	mer				Grid	Con	inection
		Capaci	ty(MV/	A) Volt	age(kV)	) T	ype		Swi	tchgear	V	oltage(kV)
Main Probl Action Plar Restoration Improveme	ems, as for as & ent	(ENAR Conditi spares	): ion as parts v	sessment vill have	and lif to be co	e eval nducte	luati d pr	ion study a ior to any r	and in najor	nventory c investmen	hec t de	ks of major cision.
<u></u>		CPA: u I	nder r USAID	ehabilitat /Bechtel	ion for Compl	Unit 5 lete:02	& 6 -Jur	: Realized n-04:	l addi	tional powe	er: 2	256MW: by

PLANT I	DATA	SHEE	Г								Sheet N	0.	
Type: TPS			Ref.	No.:	<b>T</b> -4		Sour	ce of	f Informat	tion:	ENAR/CF	A	
Name of Po	ower Pl	ant	Bag	hdao	d South	TPS	Pow	er St	tation ID:				
It	ems								Descript	ions			
Location			Gov	erno	rate	City					Coordina	tes	
			В	agho	dad				N:		]	E:	
	Unit	Year	of	Nan	neplate	Der	ated	ľ	No. o	of F	Reason of De	rati	ng.
	No.	Comn	nis	capa (M	icity W)	capa (M	acity W)		years i	n F	Records ( Robabilitation	of A ar	Renewal ,
Unit	1	1984	4	(111	55	(11)	40		19	(	ENAR) due	e to	lack of spare
Data	2	198-	4		55		40		19	p	oarts for rout	ine	maintenance,
	3	198-	4		55		40		19	h	ore-heaters a	ne s nd o	combustion
	4	198	4		55		30		19	s ບ	ystem and, c inits 5 and 6	over	-age of thermal
	5	196	6	6	57.5		30		38				
	6	196	6	6	57.5		30		38				
Total of plant	6			ç	355		210						
Production		Maxim	um	I	Annual	er	nergy	Sta	ation use	S	Station total	effic	ciency(%)
Record in 2	002	power		ł	product	tion (k	Wh)	ene	ergy(kWh	n) A	At Gen.Term.		At Trans.Term.
		output	(MW	.)									
		23	30		1,489	9,957,0	00						
Fuel		Design	Г	ype		Fuel	Туре	Α	lt. Fuel	F	Fuel treat.		Fuel storage
			F	'uel (	Dil							,	
		Gas Co	ontent	& C	alory (1	Lower)		0	il Charac	terist	tics & Calory	(Lo	wer)
D '1		(7.Fuel Main	Oil/N	liddl M	e Refin	ery Pro	oject)		Boilor	Tury	Monufoo	+-	Food water
Boller		stream		St	team Te	emp.	cap	acity	7	тур	urer	U	treatment
		press.(]	MPa)	(d	eg.C/de	eg/C)	(t/h)	)					
a. <b>m</b> 1		0.t	on don		014 Doub	lution	Mar	a.fo	atumon	Cor	CE	~	
Steam Turk	oine	or cross	s com	п р.)	(rpm	)	ma	nura	cturer		ming water	S	team Extract.
							GE						
Electrical	&				Gene	erator					Electrica	ıl &	Control
Control		Capaci	ty(MV	/A)	Powe facto	er r	Ma	nufa	cturer	Ele Ma	ctrical nufacturer	С	ontrol System
				Μ	lain Tra	ansforr	ner				Grid C	oni	nection
		Capaci	ty(MV	/A)	Volta	ige(kV)	Γ	ype		Swi	itchgear	Ve	oltage(kV)
Main Probl	ems,	(ENAR	) It is	unli	kely th	at part	ial rel	nabil	litation of	this	power station	1 wi	ll be technically
Restoration	ns &	and eco	onomi	cally	justifi	ed. It is	s recor	nme	nded that	mini	mum mainte	ena	nce required to
Improveme	ent	sustain	n the p	orese	ent leve	l of ger	neratio	on sh	ould be ca	arried	d out over ne	xt fe	ew years.

Note: PREPARATORY WORK FOR THE MASTER PLAN OF ELECTRICITY SECTOR

Type: TPS			Ref.	No.:'	T-5		Sou	ırce	e of	Informat	ion:	ENAR?CPA	ł	
Name of Po	ower P	lant	Ν	Iusa	yab TF	PS	Pov	ver	Sta	ation ID:				
It	ems									Descripti	ions			
Location			Gove	ernoi	rate	City						Coordina	ıtes	
			Babe	əl		Musa	ayab			N:			E:	
	Unit No.	Year Comm sionin	of I nis c ng	Nam capao (MV	eplate city N)	Der capa (M	ated acity IW)			No. or years in operation	f Re Re Re	ason of Der cords c habilitatior	atir of 1 an	ng. Renewal , id etc.
Unit	1	198	7	3	00		210			15	(E)	NAR)		
Data	2	198	7	3	00		215			15		Defects in itrol system	ıtł n	he turbine and
	3	199	1	3	00		220			12	2	Inadequat	e a	and incomplete
	4	198	7	3	00		235			15	ma	intenance olonged op	erat	and forced
											ori	ginal	ora	manufacturer's
											rec	ommendat	ions	8.
Total of plant	4			1,2	200		880	)						
Production		Maxim	um	A	nnual	ene	ergy	St	tati	ion use	Sta	ation total e	effic	iency(%)
Record in 2	002	power		р	roduct	ion		er	ner	gy (kWh)	At	Gen.Term.		At Trans.Term.
		output	(MW)	)	(kWh)	)							$\rightarrow$	
		93	35		5,622	,020,00	00						_	
Fuel		Design	T	ype	1	Fuel	Туре	•	Al	lt. Fuel	Fu	el treat.	_	Fuel storage
				rude uel C	and Dil				Ga	as				
		Gas Co	ontent	& Ca	alory (1	Lower)			Oi	il Charact	eristic	es & Calory	(Lc	ower)
Boiler		Main		Ma	ain/Re	heat	St	ean	n	Boiler	Type	Manufac	t-	Feed water
		stream press.()	MPa)	(de	eam 16 eg.C/de	emp. eg/C)	ca (t/	pac h)	eity			urer		treatment
		167			538/5	38		27	2			B-H		
Steam Turk	oine	Type (t	anden	ı	Revo	lution	Ma	anu	ıfac	cturer	Cooli	ng water	S	team Extract.
		or cros	s comp	)	(rpm	)	D.						+	
Fleetsieel	ø				Carr		Pe	erso	ns			El satuita	_1 0	Cantural
Control	œ	Canaci	+(\\/\)	(A)	Powe	erator	м		for	tunon	Elect	rical		ontrol System
Control		Capaci	UY(1V1 V.	A)	facto	r	IVI	anu	nac	sturer	Man	ufacturer		
				Μ	ain Tra	ansforr	ner					Grid (	loni	nection
		Capaci	ty(MV	A)	Volta	ge(kV)	)	Typ	ре		Swit	chgear	V	oltage(kV)
		(												
Main Probl Action Plar Restoratior Improveme	ems, ns for ns & ent	(ENAR Comple control	t) ete reh syster	abili n of	itation Unit 1	of the and 4	units will o	s an enh	nd c ian	common r ce the reli	ehabil ability	itation of ir y of the uni	ıstr ts.	ument and
		CPA: u	nder r by USA contro	ehat AID/ ol sys	oilitatio Bechte stem	on Uni el Cor	t 2: nplet	Re: te:0	aliz 4-C	zed additi Oct04 P	onal p Princip	ower:1121 oally on the	MW tur	bines and

Type: TPS			Ref. 1	No.:'	T-6		Sour	ce o	f Informa	ation	n: El	NAR		
Name of Po	ower P	lant	Nasi	riyal	h TPS		Powe	er S	tation ID	:				
It	ems								Descrip	otior	ns			
Location			Gove	rnoi	rate	City						Coordina	tes	
			Thi-0	Qar		Nasin	riya		N:			]	E:	
	Unit	Year	of 1	Jam	eplate	Dera	ated		No.	of	Re	ason of De	rati	ng.
	No.	sionin	ns c	apao (MV	W)	Capa (M	W)		operati	n on	Re Re	cords c habilitation	ot n ai	Renewal , nd etc.
Unit	1	1978	8	2	10		130		25	-	Re	habilitated	l Ju	ne 2000,
Data	2	197	9	2	10		180		25		Re	habilitated	l Ju	ly 2000,
	3	198	)	2	10		160		25					
	4	198	)	2	10		130		25					
Total of plant	4			8	40		600							
Production	OnMaximumAnnualenergyStation useStation total efficiency(%)n 2002powerproduction (kWh)energy (kWh)At Gen.Term.At Trans										ciency(%)			
Record in 2	ord in 2002     power     production (kWh)     energy (kWh)     At Gen.Term.     At 7									At Trans.Term.				
	2002 power production (kWh) energy (kWh) At Gen.Term. At Trans.T output (MW) 755 4 428 804 000													
		75	5		4,428	3,804,0	00	-						
Fuel		Design	Ty	ре		Fuel '	Туре	A	lt. Fuel		Fu	el treat.		Fuel storage
			Cr	ude	Oil			C	Dil					
		Gas Co	ntent	& Ca	alory (1	Lower)		C	Dil Chara	cter	ristic	s & Calory	(Lo	ower)
		(1.Norr	nal Cr	ude	oil/Bas	sra)	CL.		D. 1			M. C.		The design of the
Boiler		stream			ain/Ke eam Te	emp.	cap	am acit	y Done	er 1	ype	urer	τ-	treatment
		press.(1	MPa)	(de	eg.C/de	eg/Ĉ)	(t/ĥ)	)	-					
		12.	8	54	0/540							TPE	1	
Steam Turk	oine	Type (t	andem	)	Revo (rpm	lution	Maı	nufa	acturer	C	Cooli	ng water	S	team Extract.
		01 0105	scomp	./	(i piii	/	LM	Z						
Electrical	&				Gene	erator						Electrica	al &	c Control
Control		Capaci	ty(MV	<b>A</b> )	Powe	er	Mar	nufa	acturer	F	Elect	rical	С	ontrol System
			-		facto	r	7001	-		N	Manu	ufacturer		
				м	. <sup>1</sup> . Л.	C	TPI	5				0.10	1	
		Carran				ansiorr	ner	L		0	1	Gria C	oni	nection
		Capaci		4)	voita	ige(kv)	1	уре	1	2	SW1te	engear	v	oltage(kV)
Main Probl	ems	(ENAR	) Outr	out i	s resti	ricted F	ov the	por	or quality	 7 an	d au	antity of c	lem	ineralised water
Action Plan	ns for	and clo	gging	of co	ndense	er tube	s and	cool	ing wate	r int	take	filters.		
Restoration	ns &	Overha	ul mai	ntena	ance of	f this po	ower st	tatic	on with Ro	ehat	oilita	tion of inst	rum	ent and control
mproveille	.110	CPA: F	or Uni	it ati	ion We	iii enna	ance the	$e re}{n+(e)}$	enability t	ne u	mits.	d addition	<u>ما</u> ،	nower 70MW by
		USACI	E, Com	plet	e 01-J	un-04	Com	plet	e installa	tion	of C	Cooling Tow	ver	power former by
		Water 1	Intake	was	rehab	oilitateo	d: add-	+10	8MW					
Boiler Steam Turk Electrical Control Main Probl Action Plar Restoration Improveme	ems, as for as & ent	Gas Co (1.Norr Main stream press.(1 12. Type (t or cross Capaci Capaci Capaci (ENAR and clo Overha system CPA: F USACI Water 1	ntent of nal Cr MPa) 8 andem 5 comp ty(MV)ty(MV ty(MV)ty(MV ty(MV)	X Ca Ma Stude - Ma Stude - (de 54 - - - - - - - - - - - - -	alory () oil/Bas ain/Re eam Te eam Te eg.C/de 0/540 Revo (rpm Gend Powe facto ain Trr Volta s restr ndense ance of nd 4 w ion Wa s rehab	Lower) sra) heat emp. eg/C) lution ) erator er r ansforr r ge(kV) ricted k er tube f this po ill enha ater Tr un-04 illtateo	Stea cap (t/h) Man LM LM Man TPI ner T y the s and ower si ance th eatme Comp d: add	am acit, ) nufa Z Z poc cool tatic pere ent(e pleta	Dil Chara Boile y acturer acturer acturer in quality ing wate on with Ro iliability t external): e installa 8MW	r interest of the term of	Cooli: Cooli: Elect: Manu Switc d qu take pilita mits. valize i of C	s & Calory Manufac urer TPE ng water Electrica rical ifacturer Grid C chgear antity of c filters. tion of insti	(Lc t- sal & C C C C C C C C C C C C C C C C C C C	Feed water treatment team Extract.

Type: TPS			Ref. 1	No.:T-7			Sour	ce of	Infor	mati	on: El	NAR		
Name of Po	ower P	lant	Najil	oiyah 1	PS		Powe	er St	ation	ID:				
It	ems								Desc	riptio	ons			
Location			Gove	rnorate	e (	City						Coordina	ates	
			I	Basra					N:				E:	
	Unit No.	Year Comn sionin	of N nis c g	Vamepl apacity (MW)	ate '	Dera capa (M	ated icity W)		No. zears operat	of in tion	Reas Reco Reha	son of Dera ords o abilitation	ating f and	g. Renewal , l etc.
Unit	5	197	3	100			80		27		Rest	ored Aug.	2002	except I&C
Data	6	197	3	100			80		27		Rest	ored Nov.2	2002	except I&C
Total of plant	2			200			160							
Production		Maxim	um	Ann	ual	en	ergy	Sta	tion u	ıse	Sta	ation total	effic	ciency(%)
Record in 2	002	power		proc	luction	n (k	Wh)	ene	ergy (k	Wh)	At	Gen.Term		At Trans.Term.
		output	(MW)											
		203	(?)	3	821,57	72,40	8							
Fuel		Design	Ту	vpe	F	Fuel '	Гуре	Al	lt. Fue	el	Fu	el treat.		Fuel storage
				G ai nude Oi	nd 1			Oi	il					
		Gas Co	ntent	& Calo	ry (Lo	wer)		Oi	il Cha	racte	eristic	s & Calory	, (Lo	wer)
		(1.norn (3.natu	nal Cru ral G	ude Oil) las)	)									
Boiler		Main stream press.(1	MPa)	Main Stear (deg.0	/Rehea n Tem C/deg/	at 1p. 7C)	Stea capa (t/h)	am acity )	Во	oiler '	Туре	Manufac urer	et-	Feed water treatment
												TPE	_	
Steam Turk	oine	Type (t or cross	andem s comp	R .) (r	evolut pm)	tion	Mar	nufac	cturer	,	Cooli	ng water	S	team Extract.
							TPE	2						
Electrical	&			0	lenera	ator	1					Electric	al &	Control
Control		Capaci	ty(MV/	A) P fa	ower ictor		Mar	nufao	cturer		Elect	rıcal ıfacturer	C	ontrol System
							TPF	E						
		~ .	(	Main	Trans	sforn	ner				~ .	Grid (	Coni	nection
		Capaci	ty(MV/	A) V	oltage	e(kV)	T	ype			Swite	hgear	V	oltage(kV)
Main Probl Action Plar Restoration Improveme	ems, 1s for 1s & ent	(ENA of this Conditi spares	R) ove power on ass parts w	erhaul station station essmen ill have	maint t and to be	enan life cond	evalu	his p atior prior	oower n stud r to an	stati ly an ly ma	on wil nd inv jor inv	ll increase entory che vestment d	the ecks ecisi	reliability of major on.

Type: TPS			Ref	No:T-8		Sour	ce o	f Informa	tior	n:EN	AR/CPA		
Name of Pe	wor P	ont	Hort	ho TPS		Powe		ation D					
Ivanie of FC	ome	lanı	пан	na iro		rowe	er o	Doscrin	tior	19			
Location	ems		Gove	rnorato	City			Descrip	0101	.15	Coordina	toe	
Location			UUVE F	Ragra	Δ1-1	Hartha		N:				TES T:	
	Unit	Year	of N	ameplate	Der	ated	· N	IQ. of	R	Reas	on of Derat	ing.	
	No	Comm	nis ca	apacity	capa	acity	у	ears in	R	Recor	rds of Rene	wal	, Rehabilitation
TT 1.	110.	sionin	g	(MW)	(M	(W)	0	peration	a	ınd e	etc.		
Unit	1	1978	)	200		175	2	4	Ŧ	. 1	D 1 1 11		
Data	2	1978	)	200		0			l	Jnde	r Rehabilit	atio	on by Russia ?
	3	1979	)	200		0			U	Jnde	r Rehabilit	atio	on by Russia ?
	4	1979	)	200	1	175	2	4					
Total of plant	4	4 800 350											
Production		Maxim	um	Annua	l er	nergy	Sta	ation use		Sta	ation total o	effic	eiencv(%)
Record in 2	002	power	$(\mathbf{N}\mathbf{n}\mathbf{X})$	produc	tion (k	Wh)	en	ergy (kW	h)	At	Gen.Term.		At Trans.Term.
		output 40	$(\mathbf{W} \mathbf{W})$	- 9.81	5 303 0	00				110			
Fuol		Dogion		2,010	5,505,0 Fuol	Typo	Δ	lt Fuol		Fu	ol troat		Fuel storage
I uei		Design	N(	G and	ruer	Type		nt. Puer		ru	ei ti eat.		Fuel storage
			Cr	ude Oil									
		Gas Co	ntent &	& Calory()	Lower)	<u>a</u> 1	0	il Chara	cter	istic	s & Calory	Lov	wer)
		(3.Natu Oil/Bas	iral G rah)	as) (1.No	ormal	Crude							
Boiler		Main	i di li	Main/Re	eheat	Stea	am	Boile	r Ty	ype	Manufac	t-	Feed water
		stream	(D <sub>a</sub> )	Steam T	emp.	capa	acity	7			urer		treatment
		press.(r	vii a)	(ueg.C/u	eg/C)	1	66				MHI		
Steam Turk	oine	Type (ta	andem	Revo	olution	Mar	nufa	cturer	C	Cooli	ng water	St	Leam Extract
Steam ran	,1110	or cross	comp.	) (rpn	n)						-		
							Μ	HI					
Electrical	&		<i>(</i>	Gen	erator	1			Б	71 4	Electrica	al &	Control
Control		Capacit	y(MV/	facto	er or	Mar	nufa	cturer	r N	Jani	ifacturer		ontrol System
				Main Tr	ansforr	ner					Grid C	onr	nection
		Capacit	y(MV/	A) Volta	age(kV)	) T	ype		S	Swite	hgear	Vo	oltage(kV)
Main Probl	ems,	Rehabi	litatior	of instr	ument	and c	onti	rol system	m c	of U	nit 1 and	4 v	will enhance its
Restoration	ns for ns &	Unit 2	ty. & 3: Re	ehabilitati	ion fron	n Jan.,	200	4, 12mon	ths.	•			
improveille	,110	Parts fo	or reha	bilitation	of Unit	1 and	4 w	ill be sur	plie	ed ui	nder UNDF	P tru	ust fund.
					-			r	•				

Type: GPS			Ref.	No.: G-1		Sour	ce of	f Inform	natic	on: FNAR		
Name of Po	wer Pl	ant	Mos	sul GPS		Powe	er St	tation I	D:			
It	ems					1		Descrip	otion	s		
Location			Gov	ernorate	City					Coordi	nate	98
			N	Ninewa	Al	Mosul		N:			E:	
	Unit No.	Year Comm sioning	of is g	Nameplate capacity (MW)	Der cap (N	rated acity IW)	N yo oj	lo. c ears i peratior	of in n	Reason of D Records Rehabilitati	erat of on a	ing. Renewal , nd etc.
Unit	1	1974	:	20		20				8 units out	of	10 gas turbine
Data	2	1974	:	20		0		27		units we under the s	re	rehabilitated,
	3	1974	:	20		20				Brown, wi	th	the materials
	4	1974	:	20		18		26		procured du	ring	; 1999 to 2001.
	5	1981		20		18		22		Unit 1 and	13	replaced with
	6	1981		20		18		22		non-original	sup	oply.
	7	1981		20		18		22				
	8	1981		20		18		22		Unit 1:roter	dan	naged
	9	1981		20		0		22		Unit 2:decre	easir	ng gear vibration
	10	1981		20		18		22		Unit3 ,4: 10	MW	operated
	11	1981		20		18		22				
	12	1981		20		18		22				
Total of plant	12			250	-	184						
Production		Maximu	ım	Annual	e	nergy	Sta	ation us	se	Station tota	l effi	iciency(%)
Record in 2	002	power	(MW	) product	ion (l	(Wh	en (1	ergy kWh)		At Gen.Tern	n.	At Trans.Term.
	-	15	6	1.130	).082.0	000	(-					
Fuel		Design	Т	vpe	Fuel	Type	Α	lt. Fuel	1	Fuel treat.		Fuel storage
	-	8		NG		01						
		Gas Cor	ntent	& Calory (	Lower	)	0	il Char	acte	ristics & Ca	lory	(Lower)
			(3	.Natural Ga	as)							
Gas turbine	e	Unit	Т	ype	Μ	anufac	ture	er	Inst	allation	Τυ	urbine Controller
		2,4	Р	G5341		Hita	ichi					
		5,6,7,8,9	9 5	001		AF	G				1	
	-	10,11,12	2			Alst	om					
Electrical	&			Gene	rator					Electri	cal &	& Control
Control		Capacit	y(M\	VA) Power facto	er r	Man	ufa	cturer	El Ma	ectrical anufacturer	(	Control System
				Main Tra	nsform	ner				Grid	Con	inection
		Capacit	y(M\	VA) Volta	ıge(kV	) T	ype		Sw	vitchgear	7	/oltage(kV)
Main Probl Action Plan Restoration Improveme	ems, is for is & ent	CPA: R availabl	ealiz le.	ed Additio	nal 54	MW U	JSA	CE con	nple	te 01.Jun.0	4	Details are not
	Ī	Two nev	v uni	ts for No.1	& 3, eε	ch 25N	1W,	will be i	inst	alled under §	gran	t aid from GoJ.as
		phase 1	. Two	o units to be	repla	ced in l	Phas	se 2 by l	UNI	OP		

Type: GPS			Ref.	No.: G-2		Sour	ce o	f Infoi	rmat	tion: FNAR		
Name of Po	wer Pl	ant	Dibs	GPS.		Powe	er S	tation	ID:			
It	ems							Descr	iptic	ons		
Location			Gove	ernorate	City				1	Coordi	nate	28
			Та	meem	K	lirkuk		N:			E:	
	Unit No.	Year Comn sionin	of 1 nis c	Nameplate apacity (MW)	Der cap	rated acity (W)	N y o	lo. ears perati	of in on	Reason of De Records Rehabilitatio	erat of	ing. Renewal , nd etc
Unit	4	198	2	25	(1	25		23		Rehabilitate	d by	7 May 2004
Data	5	198	2	25		25		23		Rehabilitate	d by	7 Mar. 2004
	6	198	2	25		25		23		Rehabilitate	d by	v Mar 2004
Total of plant	3			75		75						
Production		Maxim	um	Annua	l e	nergy Wh	Sta	ation	use	Station total	effi	iciency(%)
Record in 2	002	output	(MW)	produc	1011 (1	X VV 11/	(]	kWh)		At Gen.Term	1.	At Trans.Term.
Fuel		Design	Ту	vpe	Fuel	Type	A	lt. Fu	el	Fuel treat.		Fuel storage
			Ν	G								
		Gas Co	ntent	& Calory(I	Lower)		С	)il Cha	arac	teristics & Cal	ory	(Lower)
		(3.Natı	ıral Ga	as) Press.3	0kg/cn	n2						
Gas turbine	e.	Unit	Ту	vpe	Μ	anufac	ture	er	In	stallation	Τυ	urbine Controller
					Fi	at/Avio						
Electrical	&			Gene	rator					Electric	cal &	& Control
Control		Capaci	ty(MV	A) Pow	er	Man	ufa	cturer	.   I	Electrical Manufacturer		Control System
	-			iacit	· <b>-</b>						+	
	ŀ			Main Tra	nsforn	ner				Grid	Con	inection
		Capaci	ty(MV	A) Volta	age(kV	) Т	ype		5	Switchgear	1	/oltage(kV)
		<u> </u>	<u> </u>		<u> </u>					0	$\uparrow$	<u> </u>
Main Probl Action Plan Restoration Improveme	ems, is for is & ent											

Type: GPS			Ref. N	Io.: G-3		Sour	rce of	f Infor	mat	tion: FNAR		
Name of Po	wer Pl	ant	Dibs	Mobile GI	PS,	Pow	er St	ation	ID:			
It	ems							Descr	iptio	ons		
Location			Gover	morate	City					Coordi	nate	es
			Ta	meem	K	irkuk		N:			E:	
	Unit	Year	of N	ameplate	Der	rated	N	0.	of	Reason of D	erat	ing.
	No.	Comm	nis ca	(MW)	cap	acity	ye	ears	in	Records	of	Renewal ,
Unit	1	108	ιg γ	10	(10	0	0	Jerau	011	Shifted from	on a i ini	tial Taïi GPS ?
Data	9	198	3	10		8				Shifted from	ini	tial Taji GPS ?
Data	3	198	3	10		8	_			Shifted from	ini	tial Taji GPS ?
	4	198	3	10		8				Shifted from	ini	tial Taji GPS ?
		100	0	10		0	+			Sintea non		
										-		
Total of plant	4			40		24						
Production		Maxim	um	Annual	e	nergy	Sta	ation 1	use	Station total	l effi	iciency(%)
Record in 2	002	power	(MW)	product	tion (l	xWh)	ene (1	ergy Wh)		At Gen.Tern	1.	At Trans.Term.
		2	5	39.	599.00	0	(1	(((11)				
Fuel		Design	Tv	ne	Fuel	Type	A	lt. Fu	el	Fuel treat.		Fuel storage
1 401		Dongh	N(	} }	1 401	19 00			01	1 401 010401		1 doi storage
		Gas Co	ontent &	z Calory (	Lower	)	0	il Cha	arac	teristics & Cal	orv	(Lower)
							-				5	(
Gas turbine	е	Unit	Ty	pe	Μ	anufac	eture	r	In	stallation	Τt	urbine Controller
						IH	I?					
Electrical	0			Come						Electri		e Control
Control	æ	Comer	+++	) Powe	er	λл-				Electrical		Control System
Control		Capaci	ty(IVI VA	facto	r	Mar	nurae	turer	I	Manufacturer		control by storin
				Main Tra	nsform	ner				Grid	Con	nnection
		Capaci	ty(MVA	) Volta	age(kV	Γ (	ſype		S	Switchgear	I	Voltage(kV)
Main Probl	ems,											
Restoration	ns &											
Improveme	ent											

Type: GPS			Ref.	No.: (	3-4				S	ourc	ce o	f Information	: Fl	NAR/CPA
Name of Po	ower Pl	ant	Al-T Abu	amee dulah	m(Old ) GPS		Mu	llah	n P	owe	er St	tation ID:		
Ite	ms							I	Desc	ripti	ions	3		
Location			Gove	ernora	ate	City						Coordin	nate	es
			ſ	lamee	em	K	irkuk		N:				E:	
	Unit	Year	of	Nar	neplate	Der	ated	ľ	No.	0	of	Reason of De	erat	ing.
	No.	Com	imis ing	capa (M	acity (W)	capa (M	acity W)	У	vears	3 ir ation	n	Records	of	Renewal ,
Unit	1	1977	7	(11)	-	(14)	-		9 opena	5	1	age and the	lack	of spare parts
Data	2	1973	7		20		15		2	5		for routine m	nain	tenance
Dutu	3	1981	1		20		15		2	1				
	4	1981	1		20		15		2	1				
	5	1981	1		20		15		2	1				
	6	1981	1		20		15		2	1				
	7	1981	1		20		15		2	1				
	8	1981	1		20		15		2	1				
	9	1981	1		20		15		2	1				
	10	1981	1		20		15		2	1				
	11	1981	1		20	1	15		2	1				
	12	1981	1		20	1	15		2	1				
Total of plant	12				220	1	.65							
Production		Maxi	mum		Annual	er	nergy	St	atio	n use	е	Station total	effi	ciency(%)
Record in 2	002	power outpu	r it (M	W)	product	ion (k	(Wh)	en (	lergy kWł	/ n)		At Gen.Term	l <b>.</b>	At Trans.Term.
		]	169		1,050	,290,0	00	_						
Fuel		Desig	m	Туре		Fuel	Туре	A	Alt. F	Fuel		Fuel treat.		Fuel storage
				NG										()
		Gas (	Contei	nt & (	Calory(L	ower)		(	Dil C	hara	acte	eristics & Cal	ory(	Lower)
		440kg	g/cm2	<b>T</b>		M				1	T	4 a 11 a 4 : a a	ጥ	unhim a Caraturallari
Gas turbine	e.	2 0 mt		5001		AF	anutae EG.	tur	er	-	ms	tallation	10	Irbine Controller
	-	3-7		5001		JB	E							
		8-12		5001		JB	E				1			
Electrical	&				Gener	ator	1				DI	Electric	al &	& Control
Control		Capa	city(N	IVA)	factor	r	Mar	nufa	lctur	er	M	lectrical anufacturer		Control System
	·			M	ain Trar	sform	er					Grid	Con	nection
		Capa	city(N	IVA)	Volta	ge(kV)	Г	ype	e		Sv	witchgear	V	/oltage(kV)
Main Probl Action Plan Restoration Improveme	ems, 1s for 1s & ent	ENAI e CPA:	R) Co nhano Reha	omple ce the abilita	te rehab reliabil	ilitationity of t	on of o he un 1,2,3	ld u its. ,5,1	units 1,12	and	l ma th	ajor overhaul rehabilitatior	of r	new units will f the main and
		auxili	ary g	as fee	ding sys	tem								

Type: GPS			Ref. 1	No.: C	ł-5					Sou	arce of Informa	atior	n: FNAR
Name of Po	ower P	ant	Al-Ta GPS	ameer	n (New I	Mullah	Abd	ullał	n)	Po	wer Station ID	:	
Iter	ns		012.0					Ι	Descri	ptior	ns		
Location			Gove	rnora	.te	City				_	Coordi	nate	es
			Tame	eem		Kirkı	ık		N:			E:	
	Unit	Ye Co	ar of ommis	Na cap	meplate pacity	Dera capa	ated acity	]	No. years	of in	Reason of D Records	erat of	ing. Renewal ,
	NO.	sic	ning	(1	MW)	(M	W)	(	opera	tion	Rehabilitati	on a	ind etc.
Unit	1	20	00		37	;	30		4				
Data	2	20	00		37	;	30		4				
	3	20	00		37	;	30		4				
	4	20	00		37	;	30		4				
	5	20	00		37	;	30		4				
	6	20	00		37	;	30		4				
	7										_		
	8					-							
	9					-							
	10					_							
	11	_											
<b>T</b> + 1 C	12	_					00				_		
plant of	Total of 6 plant				222		80						
Production		Ma	ximum	1	Annual	ene	ergy	Sta	ition i	ıse	Station tota	l effi	iciency(%)
Record in 2	002	out	put (M	IW)	(kWh)	)		ene (k	Wh)		At Gen.Tern	n.	At Trans.Term.
			222		1,485,	,902,00	00						
Fuel		Des	sign	Тур	е	Fuel '	Туре	I	Alt. F	uel	Fuel treat.		Fuel storage
				NG									
		Gas	s Conte	ent &	Calory (I	Lower)		(	Dil Ch	narac	teristics & Ca	lory	(Lower)
Gas turbine	e	Uni	it	Туре	9	Ma	nufa M(C)	ictur hino	er	Ir	stallation	Tu	arbine Controller
								IIIIIa	.)	+			
Electrical	&				Gener	rator					Electri	cal &	& Control
Control		Cap	pacity()	MVA)	Powe	er r	Ma	nufa	acture	r	Electrical Manufacturor	0	Control System
					Tacto.	1							
				N	lain Trai	nsform	er				Grid	Con	inection
		Car	pacitv()	MVA)	Volta	ge(kV)		Type	e,		Switchgear	1	/oltage(kV)
		Jul			,0100			- J P	-	-+'		+	
Main Probl	ems,												
Action Plan	ns for												
Improveme	ns &												
	-	CP	A: Reh	abilita	ation : Re	alized	Addi	tion	al 30N	IW b	y USACE, Co	mple	ete 01.Jul.04
											- ,	1	

Type: GPS			Ret	f. No.:	G-6		Sou	arce	of Infor	mati	ion: FNAR			
Name of Po	wer Pl	ant	Ba	ji GPS	S		Pov	wer	Station	ID:				
It	ems			-					Descri	ptio	ns			
Location			Go	verno	rate	City				-	Coordin	nate	es	
			Sal	lah al	-Din	Baji			N:			E:		
	Unit No.	Year Comn sionin	of nis g	Nam capa (M	neplate acity W)	Der capa (N	ated acity IW)		No. years operati	of in ion	Reason of D Records Rehabilitati	era of on a	ting. Renewal , and etc.	
Unit	1	200	3	1	159		159		1		Sep.03 start	ed o	operation	
Data	2	2003	3	1	159		159		1		Sep.03 start	ed o	operation	
	3	(200	4)	(1	159)	(	159)		-		May 04 star	t co	mmissioning	
	4	(200	4)	(]	159)	(	159)		-		May 04 star	t co	mmissioning	
	<b>5</b>													
	6													
	7													
	8													
	9													
	10													
	11													
	12													
Total of plant	4			6	336		280							
Production		Maxim	um	A	Annual	ene	ergy	St	ation us	e	Station tota	l eff	ficiency(%)	
Record in $2$	002	output	(MV	V)	(kWh)	on		er (	iergy (kWh)		At Gen.Tern	n.	At Trans.Term.	
		1							. ,					
Fuel		Design	,	Туре		Fue	l Tyr	be	Alt. Fue	el	Fuel treat.		Fuel storage	
		U		Crude	e Oil									
				/Gas (	Dil									
		Gas Co	nten	it & C	alory (L	ower)	)		Oil Cha	ract	eristics & Cal	ory	(Lower)	
		(4.Gas	Oil)											
Gas turbine	e .	Unit	r	Туре		Ma	anufa	actu	rer	Ins	stallation	Tu	rbine Controller	
						_	Ar	nsal	do					
						+								
Electrical	&				Gener	ator					Electric	cal &	& Control	
Control		Capaci	ty(M	VA)	Power factor	r	Ma	anu	facturer	E M	lectrical Ianufacturer	(	Control System	
				Ma	ain Tran	sform	er				Grid	Con	nection	
		Capaci	ty(M	VA)	Volta	ge(kV)	)	Typ	pe	S	witchgear	V	/oltage(kV)	
Main Probl Action Plan Restoration Improveme	ems, is for is & ent													
1	-	CPA: C	lomp	letior	n of Un	it 3 8	<b>z</b> 4: 1	Rea	lized ad	ditic	onal 219MW	by '	TFRIE, complete	
		31.May	.04 (	Wate	r treatm Crude (	ient p	lant i	is in	cluded)	ont	'Realized Add	litia	mal 125MW	
		Com:	plete	ed .	UTUUE (	лı (0	iiver	5101	ուրու	ient	·neanzeu Auo	<u>а</u> 110	11ai 1201vI VV	

PLANT D	DATA	SHEE	Г							Sheet	No	
Type: GPS			Ref.	No.: G-7		Sou	rce	of Info	orma	tion: FNAR		
Name of Po	wer Pl	ant	Вајі	Mobile Gl	PS	Pow	ver S	Statio	n ID:			
Ite	ems							Desc	riptio	ons		
Location			Gov	ernorate	City					Coordia	nate	es
			Sal	ah al-Din		Baji		N:			E:	
	Unit	Year	of	Nameplat	e De	rated	]	No.	of	Reason of De	erat	ing.
	No.	Comn	nis	(MW)	cap (N	acity AW)	2	years operat	1n tion	Records Rebabilitatio	of ma	Renewal,
Unit	1	200	4	23	(1)	20		operat		nenabilitatio	лі а	ind etc.
Data	2	200	4	23		20						
	3	2004	4	23		20						
	4	200	4	23		20						
	<b>5</b>	200	4	23		20						
	6	2004	4	23		20						
	7	200-	4	23		20						
	8	200	4	23		20						
										-		
Total of plant	8			184		160						
Production		Maxim	um	Annua	l e	nergy	S	tation	use	Station total	effi	iciency(%)
Record	in	power	(MW	) produc	tion (	kWh)	eı	nergy (kWh)	)	At Gen.Term	۱.	At Trans.Term.
2002		output	(1)111	,					/			
Fuel		Design	Т	vpe	Fuel	Type		Alt. Fi	uel	Fuel treat.		Fuel storage
		8		<b>J I</b> -	-	J 1 <sup></sup>			-			
Gasturbine	,	Unit	Т	ype	М	anufa	ctur	er	In	stallation	Τυ	urbine Controller
Gub turbine	· ·											
									+			
									_			
Electrical	&			Gene	erator					Electric	al 8	& Control
Control		Canaci	tv(M\	(A) Pow	ver	Ma	nuf	acture		Electrical		Control System
		oupuoi	09 (111 )	fact	or		iiuit	aovare	1	Manufacturer		
	-											
	-			Main Tra	ansforn	ner				Grid	Con	nection
		Capaci	ty(MV	VA) Volt	age(kV	) [	Гур	е	5	Switchgear	1	/oltage(kV)
Main Proble Action Plan	ems, is for											
Restoration	is &											
Improveme	nt	CDA · 1	Joh!		onetia	• D	<u>_1:-</u>	od - 1	الم:	nal 1901/007 1	., п	
		01.Feb	.04	e new gen	eratior	ı • Ke	aliz	ed ad	101110	nai iz91VLVV b	у 1	FRIE, Complete

Note:

PREPARATORY WORK FOR THE MASTER PLAN OF ELECTRICITY SECTOR

Type: GPS			Ref	. No.: (	G-8		Sou	irce (	of Inform	mat	ion: FNAR/CI	PA/J	ICA
Name of Po	ower Pl	ant	Taj	i GPS			Pow	ver S	Station 1	D:			
It	ems						1		Descri	ptio	ons		
Location			Gov	vernora	ate	City					Coordi	nate	es
			E	Baghda	ad	K	arkh	-	N:			E:	
	Unit No.	Year Comm sionin	of nis g	Name capac (MW	eplate ity V)	Der cap	ated acity IW)		No. years operatio	of in on	Reason of D Records Rehabilitati	erat of on a	ing. Renewal , nd etc.
Unit	1	197	3	2	0		20				Only 10M	W	operational,
Data	2	197	3	2	0		20				cooling & c normal	contr	rol system not
	3	197	3	2	0		17				Same as abo	ove ,	roter damaged.
	4	197	9	2	0		17		24		Roter dama	ged.	
	5	2004	4	2	0		20				Out of order	· (to	be replaced)
	6	197	9	2	0		15		24		Same as un	it 18	τ 2
	7	197	3	2	0		16		27		Roter dama	ged.	
	8												
	9												
	10												
	11												
<b>T 1 1</b>	12						105						
plant	7			16	30		125						
Production		Maxim	um	A	nnual	er	nergy	St	tation u	lse	Station tota	l effi	iciency(%)
Record in 2	002	power output	(MW	() pr	roduct	10n (F	(wn)	er (	(kWh)		At Gen.Terr	n.	At Trans.Term.
	-	10	)1		687,	924,00	00						
Fuel		Design	J	Гуре		Fuel	Type	A	Alt. Fue	el	Fuel treat.		Fuel storage
			N	٩G									
		Gas Co	ntent	t & Ca	lory (I	lower)	)	(	Oil Cha	ract	eristics & Ca	lory	(Lower)
Gas turbine	e .	Unit	Γ	ype		M	anufa	ctur	er	Ins	stallation	Tu	rbine Controller
	-		5	5001		Hi	tachi						
Electrical	&			_	Gener	ator					Electri	cal &	& Control
Control		Capaci	ty(M	VA)	Powe factor	er r	Ma	inufa	acturer	E N	Electrical Aanufacturer	C	Control System
				Mai	n Trar	nsform	ner				Grid	Con	nection
	Capaci	ty(M	VA)	Volta	ge(kV	) '	Туре	9	S	Switchgear	V	/oltage(kV)	
Main Probl Action Plan Restoration Improveme	ems, ns for ns & ent	CPA: Rehabilitation: GPS Realized Additional 74MW by USACE, Cor 01.Jun.04								SACE, Complete			
		Unit 1,	2, 3,	5: to b	e repl	aced u	nder	grar	nt aid of	Go	J.		
		Unit 4,	6&'	7 to be	rehat	oilitate	ed uno	der U	JNDP t	rus	t fund.		

Type: GPS			Re	f. No.	: G-9		Sou	arce	of Info	rmat	tion: FNAR		
Name of Po	wer Pl	ant	Та	ji Mol	bile GP:	s	Pov	ver S	Station	ID:			
It	ems			•					Descr	iptio	ons		
Location			Go	verno	orate	City				-	Coordi	nate	es
				Bagh	dad	k	Karkh	1	N:			E:	
	Unit No.	Year Comm sionin	of nis g	Nar capa (M	neplate acity W)	Der cap (N	rated acity IW)		No. years operati	of in on	Reason of D Records Rehabilitation	erat of on a	ing. Renewal , ınd etc.
Unit	1	1983			10		10		<u>^</u>				
Data	2	1983			10		10						
	3				10		?						
	4				10		?				-		
	5				10		?				ļ		
	6				10		?				ļ		
	7										ļ		
	8										ļ		
	9												
	10												
	11										ļ		
	12 otal of 2										ļ		
Total of plant	tal of 2 ant Oduction Max				60		20						
Production	roduction Max				Annual	en ion (1	nergy	S	tation	use	Station total	l eff	iciency(%)
Record	-	output	(MV	N)	product	10n (F	( vv n)	ei	(kWh)		At Gen.Tern	n.	At Trans.Term.
Fuel		Design		Туре		Fuel	Туре	; ]	Alt. Fu	el	Fuel treat.		Fuel storage
	-			Gas (	Dil								
	-	Gas Co	nter	nt & C	Calory (1	Lower	)	(	Oil Ch	arac	teristics & Cal	lory	(Lower)
Gasturbing	2	Unit		Type		М	anufa	actur	rer	In	stallation	Т	urbine Controller
Gub fuibilit						IH	Ι						
	-		_										
Electrical	&				Gener	rator					Electri	cal à	& Control
Control	a	Capaci	ty(M	IVA)	Powe	er r	Mε	anufa	acture	. I I	Electrical Manufacturer	(	Control System
	ſ												
		Main Trar				nsform	ner				Grid	Cor	nnection
	ŀ	Capaci	ty(M	IVA)	Volta	ge(kV	)	Тур	e	5	Switchgear	7	Voltage(kV)
							_						
Main Probl Action Plan Restoration Improveme	lems, ns for ns & ent												
	provement												

4 Type: GP	S		Re	f. No	.: G-10		Sou	rce c	of Info	rmat	tion: FNAR/C	PA	
Name of Pc	wer Pl	ant	Do	oura (	<b>JPS</b>		Pow	ver S	tation	ID:			
It	ems								Desci	riptio	ons		
Location			Go	vern	orate	City					Coord	inate	es
			Ba	ghda	d				N:			E:	
	Unit No.	Year Comn sionin	of nis ug	Nai cap	neplate acity IW)	Den cap	rated acity (W)	l y o	No. Tears perat	of in ion	Reason of I Records Rehabilitat	erat of	ing. Renewal , nd etc
Unit	1	198	1		25		25		22	-	The rehabi	itati	on of Unit 1,
Data	2	198	1		25		25		22		2  and  4  w	as c	ompleted. in
	3	198	2		25		25		21		2000 and 20	JU1.	
	4	198	2		25		25		21		The rehabi	litati	on of Unit 3 to
	5	100	_				_0				be complete	ed by	Jun.2004
·	6												
·	7												
	. 8												
	9												
	10												
·	11												
	12												
Total of plant	total of 4 lant Ma				100		100						
Production	Production Ma				Annual	e	nergy	St	ation	use	Station tota	ıl effi	iciency(%)
Record in 2	002	power	(M	V)	product	ion (l	xWh)	en	lergy kWh)		At Gen.Ter	n.	At Trans.Term.
		11	3	()	543 191	000		(	K VV 11/				
Fuel		Dogion	.0	Type	040,101	Fuol	Typo		lt Fr	ol	Fueltreat		Fuel storage
i uci	-	Design		NG		Tuci	Type	1	110. 1 0		i uci ti cat.		i dei storage
		Gas Co	nter	nt & (	Calory (1	ower	)	(	)il Ch	arac	teristics & Ca	lorv	(Lower)
		13kg/cr	m2	10 00 0	Jaiory	10 10 01	/			arac		uory	(Lower)
Gasturbine	2	Unit		Туре		Μ	anufa	ctur	ər	In	stallation	Τι	arbine Controller
Gub fuibilit				TG20	)	Fi	at/Avi	0					
			_										
Electrical	&				Gener	ator					Electr	ical &	& Control
Control	~	Capacit	ty(M	IVA)	Powe	er	Ma	nufa	cture	r I	Electrical	(	Control System
					Tacto	r					vianulacturer		
	-			Μ	l ain Trai	nsform	ner				Grid	l Con	inection
Capa			ty(M	IVA)	Volta	ge(kV	) ′	Турє	•	5	Switchgear	7	/oltage(kV)
	-	-	-		1							$\uparrow$	-
Main Proble Action Plan Restoration Improveme	ems, is for is & ent												
		CPA: 1 01.Jun	Reha .04	abilita	ation U	nit 3	. real	ized	Add	ition	al 20MW by	y US	SACE, Complete

Type: GPS			Ref.	No.:	G-11		So	ource	of In	form	natio	on: ENAR/CF	ΡA	
Name of Po	wer Pl	ant	Al-6	Quds (	GPS		Po	wer	Stati	on II	):			
It	ems								Des	script	tion	ıs		
Location			Gov	vernor	rate	City						Coordi	nate	es
			В	Bagdh	ad				N				E:	
	Unit	Year	of	Name	eplate	Der	ated	1	No.	0 	of	Reason of De	erat	ing.
	No.	sionin	ng	(MV	V)	(M	IW)	ý	opera	ation	n	Rehabilitatio	on ma	nd etc.
Unit	1	200	2	12	23	1	110			2		Crude Oil Co	nve	ersion
Data	2	200	2	1	23	1	110			2		Equipment a	adde	ed(+1601MW)
	3	200-	4	12	25		96					(to be comple	eted	31 May 04)
	4	200	4	12	25		96							
	5	200-	4	4	13	;	33					(to be comple	eted	22 Mar 04)
	6	2004	4	4	13		33							
	7	200-	4	4	13		33							
	8	200-	4	4	13		33				_	T 1 4 4 4 4 4 4	1	1
	9										_	LM6000 718	be c	larified
	10										-			
	12										_			
Total of	8			6	68	5	544							
plant								~						
Production		Maxim power	um	A p	nnual roducti	ener ion	gy	Sta ene	tion u ergy (]	ıse «Wh		Station total	effi	ciency(%)
Record in 2	002	output	(MW	()	(kWh)				- 87 (-	,	,	At Gen.Term	۱.	At Trans.Term.
		25	54		534,50	04,300	)							
Fuel		Design	Г	ype		Fuel	Тур	е	Alt.	Fuel		Fuel treat.		Fuel storage
		Dual	C	Crude	Oil				Gas	Oil				
		Gas Co	ontent	: & Ca	alory (I	.ower)	)		Oil C	hare	acte	eristics & Cal	ory	(Lower)
Cart 1:		Unit	Т	Vne		Manı	ufac	ture	r	Ins	stall	lation	Tu	rhine Controller
Gasturbine	э.	1,2,3,4	F	rame	9?	man	urac	tur ci	L	Do	ng	Fang	10	
		5,6,7,8	F	rame	6?									
	0				a								1.0	
Electrical	&	0	( <b>)</b> ( <b>)</b> ( <b>)</b>	74)	Gener	ator r	м	r	C		El	Electric	$al \delta$	& Control Control System
Control		Capaci	ty(M)	VA)	factor	•	М	lanu	tactu	rer	M	anufacturer		Some of System
				Mai	in Trar	sform	ner					Grid	Con	nection
		Capaci	ty(MV	VA)	Volta	ge(kV)	)	Typ	be		Sv	witchgear	V	/oltage(kV)
Main Duch	oma													
Action Plan	enns, ns for													
Restoration	ns &													
mproveine	110	CPA: C	ompl	etion	of Uni	t 3 &	4:1	Reali	ized 4	\ddi+	ion	al 175MW	hv ′	FRIE Complete
		31.May	7 04.	Qud	s No. 5	-8 Nev	w Ge	enera	ation	: Rea	aliz	ed Additional	l 12	0MW by TFRIE ,
		Comple	ete 22	.Mar.	04									- /

Note: PREPARATORY WORK FOR THE MASTER PLAN OF ELECTRICITY SECTOR

Type: GPS			Ref.	No.:	G-12		Sou	rce c	of Inforr	nat	ion: FNAR/C	PA	
Name of Po	wer Pl	ant	Hill	a GP	S		Pow	ver S	station I	D:			
Ite	ems								Descri	ptio	ns		
Location			Gov	vernoi	rate	City					Coordi	inate	es
				Babe	el	]	Hilla		N:			E:	
	Unit No.	Year Comn sionin	of nis g	Nam capa (MV	eplate city W)	Der cap	ated acity IW)	l y o	No. vears i operatio	of in n	Reason of D Records Rehabilitati	erat of on a	ing. Renewal , nd etc.
Unit	1	1972	2	2	20		18		31		Age of the u	anits	and generally
Data	2	2004	1	6	20		0				poor conditi	on.	
	3	197	2	4	20		18		31		Unit 2 was	repla	aced
	4	197	2	4	20		18		31				
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												
Total of plant	4			8	80		54						
Production	Production Ma				nnual	en (1	nergy	St	ation u	se	Station tota	l effi	iciency(%)
Record in 2	002	power output	(MW	7) p	roduct	ion (F	(Wh	en (	ergy kWh)		At Gen.Terr	n.	At Trans.Term.
		8	1	,	511.	047.00	00	Ň					
Fuel		Design	Г	[vpe	,	Fuel	Type		Alt. Fue	1	Fuel treat.		Fuel storage
		0	Ν	NG			51						
		Gas Co	ntent	t & Ca	alory (I	lower)	)	(	Dil Chai	ract	eristics & Ca	lory	(Lower)
		24kg/cr	n2		U							U	
Gas turbine	9	Unit	Т	ype		M	anufa	ctur	er	Ins	stallation	Τυ	urbine Controller
			5	5001		Al	stom						
												-	
Electrical	<i>&amp;</i> <sub>7</sub>				Gonor	ator					Floetri		& Control
Control	œ	Canaci	tv(MN	VA)	Powe	r	Ma	nufa	octurer	F	lectrical		Control System
00110101		Capaci	UY (141 )	VI 1)	factor	<u>.</u>	ma	nura		Ν	Ianufacturer		U U
				Ma	in Trar	nsform	ner				Grid	Con	inection
		Capaci	ty(MV	VA)	Volta	ge(kV	) [	Гуре	9	S	witchgear	7	/oltage(kV)
Main Probl Action Plan Restoration Improveme	ems, is for is & nt	<ul> <li>(ENAR) Complete rehabilitation, which can reduce the operation and maint cost, will be beneficial.</li> </ul>							d maintenance				
		CPA: 13.Feb.	Repla 04	acem	ent of	Unit	2: Re	ealiz	ed add	litio	nal 17MW b	ру Т	FRIE, Complete

PLANT I	DATA	SHEE	Г							Sheet N	0.	
Type: GPS			Ref. N	Io.: G-13		So	urce	of Infor	mat	ion: FNAR/CH	PA	
Name of Po	ower Pl	ant	Najaf	GPS		Po	wer	Station	ID:			
It	ems							Descri	ptic	ons		
Location			Gover	morate	City					Coordi	nate	28
			N	lajaf				N:			E:	
	Unit	Year	of N	ameplate	Dei	rated	l	No.	of	Reason of D	erat	ing.
	No.	sionin	nis ca	(MW)	cap (N	acity AW)	7	years operation	in m	Records Rehabilitation	ot on a	Renewal ,
Unit	1	197	6	63		30		27		Age and the	lack	of spare parts
Data	2	197	6	63		52		27		for routine n Unit 2 rehat	nain pilita	itenance. ated Jan.04
	3	197	6	63		50		27		Rehabilitate	ed:	Oct.2001 (New
	4									gas/oil syste	m)	
	5											
	6 7											
	8											
	9											
	10											
	11											
	12											
Total of plant				189		132						
Production		Maxim	um	Annual	. en	ergy	St	ation us	e	Station total	l effi	ciency(%)
Record in 2	002	power output	(MW)	(kWh)	ion )		en (	ergy kWh)		At Gen.Tern	1.	At Trans.Term.
		16	30	956,4	488,50	0						
Fuel		Design	Ty	pe	Fuel	Туре	e	Alt. Fue	el	Fuel treat.		Fuel storage
			NC	х <del>х</del>								
		Gas Co	ntent 8	z Calory (	Lower	)		Oil Cha	rac	teristics & Cal	ory	(Lower)
		21kg/ci	m2									
Gas turbine	e .	Unit	Ty	pe	Μ	anuf	actu	rer	In	stallation	Tu	rbine Controller
			13]	D	Bl	BC						
Electrical	&			Gene	rator					Electri	cal &	& Control
Control	æ	Capaci	ty(MVA	) Powe	er	М	anuf	acturer	F	Electrical		Control System
				facto	1				-	iunuuovuror		
				Main Tra	nsforn	ner				Grid	Con	nection
	·	Capaci	ty(MVA	) Volta	ige(kV	)	Тур	e	S	Switchgear	V	/oltage(kV)
			-		-							_
Main Probl Action Plar Restoration Improveme	ems, ns for ns & ent											
		CPA: 1 25.Jan	Rehabil .04	itation U	Jnit 2	: Re	ealize	ed Addi	tior	nal 20MW by	уТ	FRIE, Complete

Type: GPS			Ref	f. No.:	G-14		Sou	rce o	f Infor	mat	tion: FNAR/CI	PA	
Name of Po	ower Pl	ant	Kh	or Al-	Zuber	GPS	Pow	ver S	tation	ID:			
It	ems								Descri	ptic	ons		
Location			Gov	verno	rate	City				_	Coordi	nate	28
				Basr	a	Al	Zube	r	N:			E:	
	Unit No.	Year Comm sionin	of nis g	Nam capa (M	eplate city W)	Der cap	ated acity IW)	N y o	lo. ears peratio	of in on	Reason of D Records Rehabilitation	erat of on a	ing. Renewal , nd etc.
Unit	1	197	6	(	63		50		27		Rehabilitate	d Jı	ın 02
Data	2	197	6		63		52		27		Rehabilitate	d by	7 Feb 04
	3	197	6	(	63		50		27		Rehabilitate	d Ai	ug.02
	4	197	6		63		52		27		Rehabilitate	d by	v Feb 04
	5												
	6												
	7												
	8												
	9												
	10					_							
	11							_					
Total of	12						204	_					
plant of				2	152	2	204						
Production		Maxim	um	A	Annual	en	nergy	St	ation u	ıse	Station total	effi	ciency(%)
Record in 2	002	power output	(MW	V) I	oroduct	10n (k	(Wh	en (	ergy kWh)		At Gen.Tern	ı.	At Trans.Term.
	ſ	14	5		816,	200,00	00						
Fuel		Design	7	Гуре		Fuel	Type	A	lt. Fue	el	Fuel treat.		Fuel storage
			1	NG									
	_	Gas Co	nten	t & C	alory(L	lower)		C	Oil Cha	rac	teristics & Cal	ory	(Lower)
		<b>TT</b> •.		n			0			<b>.</b>	. 11	m	
Gas turbin	e	Unit	<u>'</u> ]	Гуре		Ma Al	anufa 3B/Al	<u>ctur</u> € stom	er	In	stallation	Τυ	irbine Controller
							510/110						
					~					-			
Electrical	&	<u> </u>	(2.5		Genei	rator	2.6	0		τ	Electric	$\operatorname{cal} \delta$	& Control
Control	_	Capaci	ty(M	VA)	facto	r	Ma	nufa	cturer	N	Manufacturer		Jointroi System
	-									_	~	~	
	-		<i>(</i>	Ma	in Trai	nsform	ner			-	Grid	Con	inection
	-	Capaci	VA)	ge(kV	) '	Туре		5	Switchgear	1	/oltage(kV)		
Main Probl Action Plar Restoratior Improveme	ems, ns for ns & ent												
		CPA: F TFRIE	lehat , Co	oilitat omple	ion or te 29.F	Repla eb.04	cemei	nt of	Unit 2	2&	4. Realized A	4dd	itional 66MW by

Type: GPS			Ref. 1	No.: G-15		Sou	rce	of Info	rmat	tion: FNAR		
Name of Po	ower P	lant	Shua	'yba GPS		Pow	ver S	Station	n ID:			
It	ems							Desc	riptio	ons		
Location			Gove	ernorate	City					Coordi	inate	es
			F	Basra	Sh	ua'yb	a	N:			E:	
	Unit No.	Year Comr sionir	of N nis c	Nameplate apacity (MW)	e Der cap	rated acity (W)	]	No. years operat	of in ion	Reason of D Records Rebabilitati	erat of on a	ing. Renewal , and etc
Unit	1	197	3	20	(	12		31		iteliaolitaa	011 0	
Data	2	197	3	20		12		31		-		
	3											
	4											
	5											
	6											
	7											
	8											
	9											
	10 11											
	11											
	12 Total of											
Total of plant	Total of blant Max			40		24						
Production		Maxim	um	Annua	l en	nergy	St	tation	use	Station tota	l effi	iciency(%)
Record in 2	002	output	(MW)	produc	uon (F	( VV II)	er	(kWh)		At Gen.Tern	n.	At Trans.Term.
		3	4	207	7,048,00	)0						
Fuel		Design	Ту	pe	Fuel	Type	1	Alt. Fi	ıel	Fuel treat.		Fuel storage
			N	G								
		Gas Co	ontent a	& Calory	(Lower)	)	(	Oil Ch	arac	teristics & Ca	lory	(Lower)
Gas turbin	e	Unit	Ту	vpe	Μ	anufa	ctur	rer	In	stallation	Τι	urbine Controller
			50	001	Al	stom						
Electrical	&			Gene	erator	1				Electri	cal &	& Control
Control		Capaci	ty(MV/	A) Pow facto	ver or	Ma	nufa	acture	r   1	Electrical Manufacturer	(	Control System
									-			
				Main Tra	ansform	ner			_	Grid	Con	inection
				A) Volt	age(kV	) [	Гур	e	5	Switchgear	1	/oltage(kV)
Main Probl	oma	TTI ·		1 ·	1.0		1					
Action Plar	ns for	The sta	ation w	as design	ed for p	beak lo	ad	service	e,			
Restoration	ns &	Overna	iui oi u	ints is rec	ommer	iaea.						
improveme	110											

Type: HPS						Sou	arce o	f Info	rmatior	n: ENAR		
Ref. No.:			H1									
Name of Po	ower Pla	nt	Derba HPS	an Dikhar	1	Pov	ver S	tatior	n ID:			
			Gov	ernorate		City				Coord	inate	28
Location			Sulai	imaniyah	I I	) Derbar Dikhar	n n	N:			E:	
Type of Hy	dropowe	er	Erthf	fill dam (A	b e- Si	irwan	Rive	r)				
Reservoir	volume	Ful	ll suppl	y water	Hig	gh wat	ter le	vel	Low	water level		Minimum oper-
(M m	.3)	]	level (E	L.m)		(EL.	.m)			(EL.m)		ating level (EL.m)
2,50	0	Vee	495.	19 Nomenle		Dama	tod	N	In of	Dee		of Donoting
	Unit No.	rea Comr ni	r or nissio ng	capacit (MW)	y J	capac (MV	tea eity V)	ye ope	ars in eration	Rea Rec Reha	ason ( ords abilit:	of Renewal, ation and etc.
	1	19	91	83								
Unit Data	2	19	91	83								
Data	3	19	91	83								
Total of plant	otal of 3			249		16	5			Due to the transmissi systems in Suleimani	e limi ion a 1 the vah 2	tations in the nd distribution Governorates of and Erbil
		Max	. power	Annu	ial ene	ergy	S	tatio	n use	Station	n tota	al efficiency (%)
Production		ou (N	itput AW)	pro	oductic GWh)	on		ener (kW	gy h)	At Gen.Te	erm.	At Trans.Term.
Record of P	lant			(27/0	606 1991-9	2000)						
		N	lax.	Rate	$\frac{10012}{d}$	ign)		Min	n.			
Head (m)		1	<u>m)</u> 03		(m) 80			(m 53	) :			
	Unit No.	Ty	pe of rbine	T discha at Ra	urbine arge (n	e n3/s) ead	F	evolu (rpr	ution n)	Manufact	urer	
Hydroulie	1									M' . b' l		
Turbine	2									Janan	1,	
	3									Japan		
											, .	
	Unit	Genera Capacity D			enerat	or				Electric	etrica al	al & Control
	No.	(MVA) Power fa			wer fac	ctor	Ma	anufa	cturer	Manufact	urer	Control System
Electrical	1 95 2 95								Mitsubish	i,		
& Control	2		95							Japan		
	3		95									
										1		

	Unit		Main Transforme	r	Grid Co	nnection					
	No.	Capacity (MVA)	Voltage (kV)	Туре	Switchgear	Voltage (kV)					
					1						
Main Probl Action Plar Restoration Improveme	lems, ns for ns & ent	<ul> <li>Not connected to the national grid.</li> <li>Based on the reports by Colenco Power Engineering Ltd, Coyne and Bellier, and a reconnaissance geological report about possible landslides on the left bank of Derbandikhan Reservoir, the structural integrity of the dam is questionable. A detailed study, consistent with the recommendations made in the Mission Report of Kurt Wermelinger, is required as part of long term planning for this</li> </ul>									
		<ul> <li>Condition Assessment and life evaluation study and inventory checks of major spares parts will have to be conducted prior any major investment decision.</li> </ul>									

Type: HPS						Source of Information: ENAR									
Ref. No.:			H2				Power Station ID:								
Name of Po	ower Pla	nt	Doka	n HPS		Pov	ver S	tatior	n ID:						
Location			Gov	ernorate		City				Coord	inate	s			
Location			Sulai	maniyah	Ι	Dokan	L	N:			E:				
Type of Hy	dropowe	r	Conc	rete arch o	lam (Z	ab as-Saghir River)									
Reservoir	volume	Ful	ll suppl	y water	Hig	h wat	erle	vel	Low	water level		Minimum oper-			
(M m	.3)	1	evel (E	L.m)		(EL.	m)			(EL.m)	6	ating level (EL.m)			
6,14	0	Vee	516		to	Dama	tod	N	la af	Dee		f David time			
	Unit No.	Comn	r oi nissio ng	capacit (MW)	apacity (MW) (MW		icity years in W) operation		Rec Reha	ords bilita	of Renewal, ation and etc.				
	1	19	78	82											
Unit Data	2	1978		82											
Data	3	19	78	82											
	4	19	78	82											
	5	19	78	82											
Total of plant	Total of 5 plant 5			410	410 240		0		transmission and distribution system in the Governorates of Suleimaniyah and Erbil						
		Max.	. power	Annu	al ene	ergy	S	tatio	ı use	Station	n tota	d efficiency (%)			
Production		ou (N	Itput IW)	pro ((	ductio GWh)	'n		ener (kW	gy h)	At Gen.Te	erm.	At Trans.Term.			
Record of P	lant				947										
			-	(ave. 1	978-2	978-2000)									
II. a. d. (m)		M (	lax. m)	Rate	d (desı (m)	design) 1)		(m)							
nead (m)			95		82	2		50							
	Unit	Tv	ne of	Τι	arbine		Bovolution		ition						
	No.	tu	rbine	discha at Ra	rge (n ted he	n3/s) ead	1	(rpr	n)	Manufactu	urer				
Urrdmanilia	1	Fra	ancis												
Turbino	2	Fra	ancis							Titostasi					
Turbine	3	Fra	ancis							(LMZ) Bu	ecio				
	4	Fra	ancis							(111112), 114	.551a				
	5	Fra	ancis												
	Unit	~		Ge	enerato	or	1			Elec	ctrica	ll & Control			
	No.	Ca (N	pacity MVA)	Pov	ver fac	ctor	Ma	anufa	cturer	Electric	al urer	Control System			
Electrical	1		94												
& Control	2		94				Cat	tharia	nhuro						
	3		94				. Ri	issia	anourg						
	4		94				, 10	nussia							
	5		94					Ī							

	Unit		Main Transforme	r	Grid Co	nnection							
	No.	Capacity (MVA)	Voltage (kV)	Туре	Switchgear	Voltage (kV)							
					-								
					4								
		Not connecte	Not connected to the national grid.										
		• All the units	• All the units were in operable condition.										
		• The overhaul	• The overhaul of 3 units was completed and the other 2 units were scheduled for										
		completion by 2001. However, this was not executed because of contractual and											
Main Prob	lems	administratio	administration problems.										
Action Plan	ns for	• Assessment	• Assessment needs to be carried out to determine outstanding										
Restoration	ns &	rehabilitation	n/refurbishment w	ork.									
Improveme	ent	• Detailed stru	uctural integrity	study of the da	m can be part o	f long term							
		planning.											
		Condition As	sessment and life	evaluation study	and inventory (st	ock) check of							
		major spares	s parts will have	to be conducted	l prior any major	investment							
		decision.											

Type: HPS				Source of Information: ENAR									
Ref. No.:	H3												
Name of Po	wer Pla	nt	Him	reem HPS		Pov	ver S	tatior	n ID:				
Logation			Gov	ernorate		City				Coordinates			
Location			D	iyala				N:		E:			
Type of Hy	dropowe	r							r		-		
Reservoir	volume	Ful	ll suppl	y water	Hig	gh wat	erle	vel	Low	water level	Minimum oper-		
(M m	3)	1	evel (E	L.m)		(EL.	m)			(EL.m)	a	ting level (EL.m)	
		Voor of Namonlato			104	.5 tod	N	lo of	Passan of Danating				
	Unit	Comr	nissio	capacit	y j	capac	ity	ye	ars in	Recor	rds c	of Renewal,	
	No.	nii	ng	(MW)		(MV	V)	ope	ration	Rehab	ilita	tion and etc.	
Unit	1	19	81	25					13	Due to limit	tatio	n in the flow of	
Data	2	19	81	25					13	water			
Total of plant	2			50		10							
		Max. power A			ial ene	ergy	S	tatior	ı use	Station	efficiency (%)		
Production ou Record of Plant (I		tput /IW)	pro (	on	n energy (kWh)			At Gen.Ter	m.	At Trans.Term.			
100010011	iant	(	,					(	/				
		N	Iax.	Rate	d (des	ign)		Mir	<b>1</b> .				
Head (m)		(	m)	(m)				(m	)				
	Unit	Ту	pe of	discha	arge (n	e n3/s)	(3/s) Revolution		Manufactu	rer			
	No.	tu	rbine	at Ra	ated h	ead		(rpr	n)				
Hydraulic	1	Ka	ıplan		98.5			166	.7	LITOSTRJ			
Turbine	2	Ka	ıplan		98.5			166	.7	(Yogslavıa	ı)		
				G	onorat	or				Floet	rical	& Control	
	Unit	Ca	pacity	Por	wor for	ator	М	nufo	aturor	Electrical	l	Control System	
	INO.	(1	MVA)	100	wer rau	0101	IVI o	illula	cturer	Manufactu	rer	Control System	
Electrical			27.8										
& Control													
	II		Transf	forme	۱ ۲			Gri	d Co	nnection			
	Unit No	Ca	apacity Voltage			e		Tyr	0	Switchgo	nr oc	Voltago (kV)	
	10.	(1	MVA)		(kV)			тур	e.	Switchgea	11	vonage (KV)	
	No.	1)	MVA)		(kV)			Тур	00	Switchgea	ar	Voltage (kV)	

		•	Overhaul of units will be beneficial.											
Main Proble	ill have to be con	ducted prior												
Restorations	s 10r s &		any major investment decision.											
Improvemen	e to this power st	tation under												
			SCR1472/147	6 and 1483.										

Type: HPS						Sou	Source of Information: ENAR							
Ref. No.:			H4	(1/2)										
Name of Po	ower Pl	ant	Mosu	d HPS		Pow	ver S	tatior	n ID:					
Location			Gove	ernorate		City		Coordinates						
			N	inewa	Ν	Iosul		N: H			:			
Type of Hy	dropow	er												
Reservoir (M.m.	volume	Ful	ll suppl	y water	Hig	h wat	er lev	vel	Low	water level	N at	ing lovel (EL m)		
	13)		ever (E	11.III)	(EL.m)		III <i>)</i>			(EL.m) ating level (EL.				
	Unit Yea		r of	Namepla	ate	Derate		No. of		Reason of Derating,		Derating,		
	No. Con		nissio ng	capacit (MW)	У	capac (MW	ity years in		ars in tion	Records of Renewal,		Renewal,		
	M1 1986		MU)	187.5		(111)	.,	ope	iuuon		lituti			
	M2	1986 (	MU)	187.5						MII: Main II	nit			
Unit	M3	1986 (	MU)	187.5						Replacement	is u	inder discussion.		
Data	Data M4 1986		MU)	187.5						-				
	RD1	1985 (	RDU)	15										
	RD2	1985 (	RDU)	15							4	Dow Unit		
	RD3	1985 (	RDU)	15										
	RD4	1985 (RDU)		15										
Total of plant	8			810		400	)			Output is res limitation in	strict wat	ted due to er flow.		
Production		Max.	power	Annu	al ene	ergy	S	tation	n use	Station to	otal e	efficiency (%)		
Record of F	lant	(MW)		pro (	GWh)	n		(kW	gy h)	At Gen.Term	ı.	At Trans.Term.		
111 2002		7	50	2,713,8		388 Jaime)		٦.						
Head (m)		MI (;	Max. (m)		(m)		.gn)		n. )					
fieau (iii)														
	Unit	Ty	pe of	T	urbine	24	Revolution		ution	Manufaat				
	No.	tur	bine	discha at Ra	arge (n ated he	13/s) ead		(rpr	n)	Manufacture	er			
Hydraulic	M1	Fra	ancis							Toshiba				
Turbine	M2	Fra	ancis							Toshiba	_			
	M3	Fra	ancis							Toshiba				
	M4	Fra	ancis							Toshiba	_			
				G	norota					Flootr	icol	& Control		
	Unit	Ca	pacity	Dee	nerau	)1 	м	£.	-4	Electrical		Control Statem		
	No. (MVA)		FOV	ver lac	tor	IVIE	inura	cturer	Manufacture	er	Control System			
Electrical											+			
& Control											+			
											+			

	Unit	]	Main Transformer	•	Grid Co	nnection					
	No.	Capacity (MVA)	Voltage (kV)	Туре	Switchgear	Voltage (kV)					
					-						
		• Output was d	etermined by wate	er flow.							
Main Prob	lems,	• Overhaul of units will be beneficial.									
Restoration	ns for	• Inventory checks of major spares parts will have to be conducted prior any major									
Improveme	ent	investment decision.									
		Discussion un	derway for rehabi	litation by grant a	id of GoJ.						

Type: HPS			Source of Information: ENAR										
Ref. No.:	H4	(2/2)		Down Station ID:									
Name of Po	wer Pla	nt	Mosul	HPS (F	PSU)	Pov	ver St	tatior	n ID:				
Location			Gove	rnorate		City				Coordir	nates	3	
Location			Niz	newa	Ν	Mosul		N:		E:			
Type of Hy	dropowe	r	Pump	ed storag	e								
Reservoir	volume	Ful	ll supply	y water	Hig	ch water level Low				water level	Minimum oper-		
(M m	3)	1	level (El	L.m)		(EL.	m)			(EL.m)	a	ting level (EL.m)	
	Unit	Yea	ur of missio	Namep	late tv	Dera	ted city		lo. of ars in	Reas	on of rds o	f Derating, f Benewal	
	No.	ni	Commissio capacity ning (MW)				N)	ope	eration	Rehab	ilita	tion and etc.	
	PS1	1990	1990 (PSU) 120							DOLLD	10		
Unit Data	PS2	1990	990 (PSU) 120							PSU: Pump	ed S	torage Unit	
Data													
Total of plant	2			240									
		Max	. power	Annu	al ene	ergy	St	tatior	n use	Station total efficiency (%)			
Production out Record of Plant (M			AW)	pro	(GWh)			(kWh)			m.	At Trans.Term.	
1000014-011	iuni	· · ·											
		N	lax.	Rate	d (desi	ign)		Min	n.				
Head (m)		(	<u>(m)</u>		(111)			(m	)				
	<b>TT</b> 1.			T	urhine	<u>,</u>							
	Unit	Ty	pe of rhine	discha	arge (n	(rpm)		Manufactu	rer				
	NU.			at Ra	ated he	ead		(1 p1					
Hydraulic													
Turbine													
	Unit			Ge	enerat	or				Elect	rical	& Control	
	No.	Ca	pacity	Poy	ver fac	tor	Ma	nufa	cturer	Electrical	1	Control System	
	110.	(1	MVA)							Manufactu	rer		
Electrical													
& Control													
	Unit		Transf	òrmei	ſ			Gri	id Co	onnection			
	No.	Ca	pacity	Voltage	Э		Tvr	e	Switchgea	ar	Voltage (kV)		
		(1	VIVA)		(kV)			<i>.</i> ,					
										ł			

		• All the units	• All the units were in operable condition.										
Main Proble	ems,	Output was a	etermined by water flow.										
Action Plan Restoration	s for	• Overhaul of units will be beneficial.											
Improveme	ent	• Inventory ch	Inventory checks of major spares parts will have to be conducted prior any										
		major invest	ment decision.										

Type: HPS						Source of Information: ENAR							
Ref. No.:	H5			Power Station ID:									
Name of Po	wer Pla	nt	Sadat	Al Hindia	https://www.uppedia.org/abs/10.00000000000000000000000000000000000	Pov	ver S	tatior	n ID:				
Logation			Gove	ernorate		City				Coordin	ates	3	
Location			В	abel	Mu	asaiyab N:			E:				
Type of Hy	dropowe	r			1								
Reservoir	volume	Fu	ill suppl	ly water	High water level			vel	Low	water level		Minimum oper-	
(M m	3)		level (E	ver (EL.m)		(EL.	m)			(EL.m)	a	ting level (EL.m)	
Unit	Unit No. 1	Yes Com 19	ar of missio ing 988	Namepla capacit (MW) 3.75	ate Derat ty capac ) (MV		ted eity V)	N ye ope	lo. of ars in eration	Reaso Recor Rehabi	n of ds o lita	f Derating, f Renewal, tion and etc.	
Data	2	1988		9.75									
	3	10	988	3.75									
	4	16	900	5.75									
Total of plant	4			15		5.0	)			Output is re- limitation in	stric wa	cted due to ter flow	
		Max	x. power	· Annu	al ene	rgy	S	tatior	n use	Station t	otal	l efficiency (%)	
Production Record of Plant		(	MW)	pro (	GWh)	n		(kW	h) At Gen.Te		n.	At Trans.Term.	
				_	- ( -								
		I	Max. (m)	Rate	d (desi (m)	gn)		Miı (m	1. )				
Head (m)			<u> </u>						<u> </u>				
	Unit No.	Ty tu	ype of ırbine	T discha at Ra	Turbine discharge (ma at Rated hea		R	levolu (rpr	ution n)	Manufactur	er		
Hydraulic	1												
Turbine	2									Sulzer-Esche	ər		
	3									Wyss			
	4												
	Unit			Ge	enerato	or				Electr	rical	& Control	
	No.	Ca (	apacity MVA)	Pov	wer fac	tor	Ma	ınufa	cturer	Electrical Manufactur	er	Control System	
Electrical	1		· ·										
& Control	2									BUIR			
	3									DULD			
	4												
										1.0			
	Unit	Main Transf Capacity Voltage				ormei	r 			Grid	1 Co	nnection	
	No.	(	CapacityVoltage(MVA)(kV)					Typ	e	Switchgea	r	Voltage (kV)	
			(MVA) (kV)										
	• Due to limitation in water flow, only 2 units operated at about 5 MW and othe	$\mathbf{r}$											
----------------	---	--------------											
	units were kept in stand by mode.												
Main Problems,	• Overhaul of units will be beneficial.												
Restorations &	Condition Assessment and life evaluation study and inventory checks of majo	$\mathbf{r}$											
Improvement	spares parts will have to be conducted prior to any major investment decision.												
	• The details of goods that are expected to arrive to this power station under	$\mathbf{r}$											
	SCR1472/1476 and 1483.												

Type: HPS					Source of Information: ENAR								
Ref. No.:	: No.: H6												
Name of Po	ame of Power Plant Samara HPS					Pov	ver S	tatior	n ID:				
Location			Gov	ernorate		City				Coord	inates	3	
Location			Sala	h al-Din	Sa	amara N:				E:			
Type of Hy	dropowe	r							-				
Reservoir	volume	Ful	ll suppl	y water	Hig	h wat	erle	vel	Low	water level		Minimum oper-	
(M m	3)	1	evel (E	L.m)		(EL.	m)			(EL.m)	a	ting level (EL.m)	
	Unit	Yea	Year of Nameplate Commissio capacity of			Derat	Derated No. of			Rea Rec	son o ords c	f Derating, of Renewal	
	No.	nii	ning (MW)		(MV	V)	ope	ration	Reha	bilita	tion and etc.		
	1	19	72	28	28								
Unit Data	2	19	72	28	28								
Data	3	19	72	28	28								
Total of plant	3			84		38				Output is a limitation	restri in wa	cted due to ter flow.	
		Max	. power	Annu	Annual ener			tatior	n use	Station	1 total	efficiency (%)	
Production Record of P	lant	ou (N	output production (MW) (GWh)		n	n energy (kWh)		At Gen.Term.		At Trans.Term.			
Record of Frant 0		,	```				( / )	/					
		N	Iax.	Rate	d (desi	ign)		Mir	n.				
Head (m)	Head (m)		<u>m)</u>		(m)			(m	)				
				T	urbino								
	Unit	Ty	pe of rhino	discha	arge (n	n3/s)	3/s) Revolution		Manufacto	arer			
	1 INO.			at Ra	ated he	ead	ad (rpm)						
Hydraulic	1	Ka	ipian					79		Enonas Tassi			
Turbine	2	Ka	nlan					70	·	Franco Ios	551		
	0	110	ipian					10					
	Unit			Ge	enerat	or	ı			Elec	etrical	& Control	
	No.	Ca (1	pacity MVA)	Pov	wer fac	ctor	Ma	anufa	cturer	Electric: Manufactu	al urer	Control System	
Electrical	1		33										
& Control	2		33				An	saldo					
	3		33										
	Unit	0		Main	Fransf	ormei	r			G	rid Co	onnection	
	No.	Ca (I	pacıty AVA)		(kV)	e		Typ	e	Switchge	ear	Voltage (kV)	
	1						┨.						
	2						An	saldo					
	3												

Main Problem Action Plans f Restorations & Improvement	is, or &	<ul> <li>Due to limita given time ar water level, rewarding.</li> <li>Overhaul of u</li> <li>Inventory ch major investu</li> <li>The details of SCR1472/14?</li> </ul>	tion in water flow, nd the third unit w major investment units will be benefi ecks of major span nent decision. of goods that are 76 and 1483.	two units operate was kept in stand t to enhance the icial. res parts will have expected to arrive	d at about 20MW, by mode. Given th station output w e to be conducted e to this power st	each, at any ne prevailing rould not be prior to any tation under

Type: HPS						Sou	rce o	f Info	rmation	ENAR				
Ref. No.: H7														
Name of Po	Qadi	ssiya	HPS	Pow	Power Station ID:									
			Gov	itha Dam	)	City				Coordi	nato	2		
Location			Al	Anbar	H	adith	9	N:		000101	E	5		
Type of Hy	dropowe	er												
Reservoir	volume	Fu	ll suppl	y water	Hig	h wat	erlev	zel	Low	water level		Minimum oper-		
(M m	3)	]	level (E	L.m)		(EL.:	m)			(EL.m)	ε	ating level (EL.m)		
										T				
	Unit	Yea	r of Namepla		ate	Derat	ted itv	N	lo. of ars in	Rea	son o orde (	f Derating, of Bonowal		
	No.	ni	ng	sio capacity (MW)		(MW	V)	ope	ration	Rehal	bilita	tion and etc.		
	1		86	110										
Unit	2	19	86	110										
Data	3	19	86	110										
	4	19	86	110										
	5	19	86	3 110 3 110										
	6	19	86	110	110									
Total of plant	6			660	660		110			Output is r limitation i	estri n wa	cted due to ter flow.		
Production N		Max	. power	Annu	ual ene	rgy	S	tatior	n use	Station	tota	l efficiency (%)		
Record of	Plant	00 (N	MW)	pro	kWh)	n		(kW	gy h)	At Gen.Te	rm.	At Trans.Term.		
1n 2002		c. J	310	704	,881,00	00								
TT 1()		N (	Max. Rate (m)		d (desi (m)	gn)		Miı (m	n. )					
Head (m)			<u> </u>						- -					
	Unit	Tv	rpe of	Turbine		21)	Revolution		ation					
	No.	tu	rbine	discha at Ra	arge (m ated he	13/s) ead		(rpr	n)	Manufactu	irer			
	1	Kε	ıplan		335									
Hydraulic	2	Kε	ıplan		335					ļ				
Turbine	3	Kε	aplan		335					CKD/LIT				
	4	Kε	ıplan		335									
	5	Ka	ıplan		335					4				
	6	Kε	ıplan		335									
	Unit	C.		Ge	enerato	or				Elec	trica	l & Control		
	No.	(1	MVA)	Pov	wer fac	tor	Mε	nufa	cturer	Manufactu	u trer	Control System		
	1													
Electrical	2													
& Control	3						KO	NCA	R					
& Control	4								~					
	5													
	6													

	Unit		Main Transforme	r	Grid Co	nnection				
	No.	Switchgear	Voltage (kV)							
<ul> <li>Doe to limitations in water flow, only one unit operated at about 40 MW a given time, and other units were kept in stand by mode.</li> <li>All the units are in good condition, except Unit 2. The output from this u limited to 80 MW because of vibration problems.</li> <li>Overhaul of units will be beneficial.</li> <li>Condition Assessment and life evaluation study and inventory checks of spares parts will have to be conducted prior any major investment decision</li> <li>The details of goods that are expected to arrive to this power station of SCR1472/1476 and 1483</li> </ul>										
		CPA: rehabilitation of 350 MW by USACE finished on April 2004.(US\$56 m\$), with 223 km T/L Increase a capacity to 550MW from the previous 100 ~200MW and 660 MW at June 2004.								

Type: HPS						Sou	arce o	f Info	rmatior	n: ENAR				
Ref. No.:			H8											
Name of Po	ower Pla	nt	Al-A	dhim HPS	5	Pov	ver S	tatior	n ID:					
Location	Location Governorate						City			Coordinates				
Location			D	Jiyala	ala Al-			-Khalis N:			E:			
Type of Hy	dropowe	er				Γ								
Reservoir	volume	Ful	ll suppl	ly water	Hig	h wat	er le	vel	Low	water level		Minimum oper-		
(M m	3)		level (F	EL.m)		(EL.	m)			(EL.m)	a	ting level (EL.m)		
Unit Data	Unit No. 1 2	Yea Comr nii (un con ruct	r of nissio ng der nst- ion)	f Nameplate capacity (MW) r 13 n) 13		Dera capac (MV	ted city V)	N ye ope	lo. of ars in eration	Reas Reco Rehab	on of rds o ilitat	f Derating, f Renewal, tion and etc.		
Total of plant	2			26										
Production		Max	. powei tput	r Annu	Annual ene			rgy Station use		Station tota		efficiency (%)		
Record of P	lant	(1	AW)	/) (kWh)				(kW	ĥ)	At Gen.Terr	n.	At Trans.Term.		
			· \		Ъ.Т.									
Hood (m)	Max. Rated (c (m) (m)		(m)	ign)		(m	n. )							
meau (m)														
	Unit No.	Ty tu	Type of turbine		Turbine discharge (m at Rated he		F	levolu (rpr	ution n)	Manufactu	rer			
Hydraulic														
Turbine														
	TInit			G	enerat	or				Elect	rical	& Control		
	No.	Ca (1	pacity MVA)	Por	wer fac	ctor	Ma	anufa	cturer	Electrical Manufactur	rer	Control System		
Electrical														
& Control														
						2					1.0			
	Unit	Ca	nacity	Main	Transf Voltage	iorme	r			Gri	d Co	onnection		
	No.	(1	MVA)		(kV)	0		Typ	be	Switchgea	ar	Voltage (kV)		

Main Problems, Action Plans for Restorations & Improvement	• The units were scheduled for commissioning in May 2002 but have been delayed due to the non-availability of materials ordered under MoU.

## 付属資料 B : Demand Forecast

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## Appendix B.1 Total Population

		l	000, : Init
Year	Male	Female	Total
1957	3,155	3,144	6,299
1965	4,102	3,945	8,047
1970	4,754	4,686	9,440
1971	4,910	4,840	9,750
1972	5,074	5,000	10,074
1973	5,244	5,169	10,413
1974	5,422	5,343	10,765
1975	5,603	5,521	11,124
1976	5,795	5,710	11,505
1977	6,183	5,817	12,000
1978	6,389	6,016	12,405
1979	6,603	6,218	12,821
1980	6,815	6,423	13,238
1981	7,035	6,634	13,669
1982	7,260	6,850	14,110
1983	7,504	7,082	14,586
1984	7,756	7,321	15,077
1985	8,015	7,570	15,585
1986	8,283	7,827	16,110
1987	8,396	7,939	16,335
1988	8,675	8,207	16,882
1989	8,953	8,475	17,428
1990	9,190	8,700	17,890
1991	9,460	8,959	18,419
1992	9,731	9,218	18,949
1993	10,001	9,477	19,478
1994	10,271	9,736	20,007
1995	10,541	9,995	20,536
1996	10,843	10,281	21,124
1997	10,987	11,059	22,046
1998	11,484	10,895	22,379
1999	11,795	11,194	22,989
2000	12,096	11,481	23,577
2001	12,425	12,388	24,813



### Source)

Iraq Population Census 1957, 1965, 1977, 1987, 1997

Appendix B.2 Regional i opulation	Appendix B.2	Regional Populatio	n
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	Governorate & Region			Population			A	Innual Incr	ease Ratio	)
		1977	1987	1997	2002	2003	77-87	87-97	97-03	77-03
1	Baghdad Region	3,189,700	3,841,268	5,423,964	6,054,355	6,024,300	1.9%	3.5%	1.8%	2.5%
	Middle Region									
2	Diyala	587,754	961,073	1,135,223	1,195,530	1,224,357	5.0%	1.7%	1.3%	2.9%
3	Anbar	466,059	820,690	1,023,736	1,193,343	1,230,139	5.8%	2.2%	3.1%	3.8%
4	Najaf	389,680	590,078	775,042	898,733	929,995	4.2%	2.8%	3.1%	3.4%
5	Kerbela	269,822	469,282	594,235	700,063	723,840	5.7%	2.4%	3.3%	3.9%
6	Qadissiya	423,006	559,805	751,331	865,171	886,594	2.8%	3.0%	2.8%	2.9%
7	Wassit	415,140	564,670	783,614	883,839	913,386	3.1%	3.3%	2.6%	3.1%
8	Babylon	592,016	1,109,574	1,181,751	1,336,826	1,385,783	6.5%	0.6%	2.7%	3.3%
	Total Middle Region	3,143,477	5,075,172	6,244,932	7,073,503	7,294,094	4.9%	2.1%	2.6%	3.3%
	North Region									
9	Tameem	495,425	601,219	753,171	829,757	848,007	2.0%	2.3%	2.0%	2.1%
10	Salah al-Din	363,819	726,138	904,432	917,169	942,314	7.2%	2.2%	0.7%	3.7%
11	Ninewa	1,105,671	1,479,430	2,042,852	2,382,348	2,453,116	3.0%	3.3%	3.1%	3.1%
	Total North Region	1,964,915	2,806,787	3,700,455	4,129,274	4,243,437	3.6%	2.8%	2.3%	3.0%
	South Region									
12	Basrah	1,008,626	872,176	1,556,445	1,823,017	1,880,178	-1.4%	6.0%	3.2%	2.4%
13	Muthanna	215,637	315,816	436,825	521,472	537,658	3.9%	3.3%	3.5%	3.6%
14	Thi-Qar	622,979	921,066	1,184,796	1,435,866	1,472,097	4.0%	2.5%	3.7%	3.4%
15	Missan	372,575	487,448	637,126	783,288	803,225	2.7%	2.7%	3.9%	3.0%
	Total South Region	2,219,817	2,596,506	3,815,192	4,563,644	4,693,158	1.6%	3.9%	3.5%	2.9%
	Total the above 4 regions	10,517,909	14,319,733	19,184,543	21,820,776	22,254,989	3.1%	3.0%	2.5%	2.9%
	<u>3 Northern Governorates</u>							r		
16	Sulaymaniyah	690,557	951,723	1,362,739	1,548,064	1,546,652	3.3%	3.7%	2.1%	3.1%
17	Erbil	541,456	770,439	1,095,992	1,298,499	1,313,718	3.6%	3.6%	3.1%	3.5%
18	Dahuk	250,575	293,304	402,970	785,409	782,490	1.6%	3.2%	11.7%	4.5%
	Total 3 Northern Governorates	1,482,588	2,015,466	2,861,701	3,631,972	3,642,860	3.1%	3.6%	4.1%	3.5%
	Grand Total	12,000,497	16,335,199	22,046,244	25,452,749	25,897,849	3.1%	3.0%	2.7%	3.0%

Appendix B.3 Number of CoE Consumers in 2001

Category	Bagl	ndad	Mid	ldle	North +	· Dahuk	So	uth	То	tal
	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
Household	609,617	73.2	640,998	83.5	411,161	82.5	355,295	85.5	2,017,071	80.2
Commercial	211,687	25.4	86,265	11.2	62,606	12.6	45,917	11.1	406,475	16.2
Industrial	2,530	0.3	3,684	0.5	2,774	0.6	1,843	0.4	10,831	0.4
Govermental	7,356	0.9	10,074	1.3	10,335	2.1	5,508	1.3	33,273	1.3
Agricultural	1,776	0.2	26,963	3.5	11,687	2.3	6,844	1.6	47,270	1.9
Total	832,966	100.0	767,984	100.0	498,563	100.0	415,407	100.0	2,514,920	100.0
	33.1%		30.5%		19.8%		16.5%		100.0%	

								Unit : Gwh	
Governorate & Region	Resident	Shops	Gov. offices	Industry	Street lighting	Distributed free	Losts	Total	%
Baghdad Region	2,294	352	2,198	480	116	33	2,437	7,910	39%
Middle Region									
Diyala	378	19	142	74	18	4	168	803	4%
Anbar	386	24	238	85	11	58	136	938	5%
Najaf	278	17	27	212	30	8	115	687	3%
Kerbela	212	18	86	32	19	6	83	456	2%
Qadissiya	215	11	172	92	5	3	109	607	3%
Wassit	212	12	169	94	5	3	218	713	3%
Babylon	363	26	177	50	9	6	90	721	4%
Total Middle Region	2,044	127	1,011	639	97	88	919	4,925	24%
North Region									
Tameem	309	19	60	64	17	2	151	622	3%
Salah al-Din	302	12	103	203	1	0	250	871	4%
Ninewa	739	68	363	186	71	11	124	1,562	8%
Total North Region	1,350	99	526	453	89	13	525	3,055	15%
South Region									
Basrah	457	27	329	79	24	7	318	1,241	6%
Muthanna	122	6	58	36	22	3	29	276	1%
Thi-Qar	275	6	80	-28	7	2	263	605	3%
Missan	153	10	93	36	53	9	94	448	2%
Total South Region	1,007	49	560	123	106	21	704	2,570	13%
Total the above 4 regions	6,695	627	4,295	1,695	408	155	4,585	18,460	90%
3 Northern Governorates									
Sulaymaniyah	339	26	97	44	10	4	164	684	3%
Erbil	387	25	133	94	11	10	319	979	5%
Dahuk	116	8	74	30	13	4	76	321	2%
Total 3 Northern Governorates	842	59	304	168	34	18	559	1,984	10%
Grand Total	7,537	686	4,599	1,863	442	173	5,144	20,444	100%

## Appendix B.4 Regional Energy Consumption at Consumers' Ends in 1990

## Appendix B.5 Energy Consumption at MoE Network Ends in 2001 and 2002







Appendix B.6 Ene	rgy Consumption per	Capita at Consumers'	Ends in 1990
------------------	---------------------	----------------------	--------------

	1990	1990	1990
		Energy Consumption	kWh/capita
Governorate & Region	Population	at Consumers' Ends	at Consumers' Ends
	(Estimate)	(GWh)	(kWh/capita)
Baghdad Region	4,269,317	7,910	1,853
Middle Region			
Diyala	1,012,476	803	793
Anbar	878,846	938	1,067
Najaf	641,749	687	1,071
Kerbela	504,803	456	903
Qaddisiya	612,782	607	991
Wasit	624,336	713	1,142
Babylon	1,133,178	721	636
Total Middle Region	5,408,171	4,925	911
North Region			
Al-Tameem	644,647	622	965
Salah-Al-Din	777,244	871	1,121
Ninewa	1,633,309	1,562	956
Total North Region	3,055,200	3,055	1,000
South Region			
Basra	1,039,906	1,241	1,193
Muthanna	348,841	276	791
Thi Qar	995,469	605	608
Missan	529,357	448	846
Total South Region	2,913,573	2,570	882
Total the above regions	15,646,260	18,460	1,180
3 Northern Governorates			
Sulaimaniya	1,062,215	684	644
Erbil	858,203	979	1,141
Dohuk	323,322	321	993
Total 3 Northern Governorates	2,243,740	1,984	884
Grand Total	17,890,000	20,444	1,143

Regions	Popul (x 1,	Population <sup>2</sup> (x 1,000) Energy Consumption at MoE Network Ends (GWh) kWh/cap		Energy Consumption at MoE Network Ends (GWh)		capita twork Ends capita)
	2001	2002	2001	2002	2001	2002
Baghdad + Middle	12,842	13,128	17,397	19,933	1,355	1,518
North + Dahuk	4,738	4,915	6,624	6,739	1,398	1,371
South	4,409	4,564	4,632	5,031	1,051	1,102
Total	21,989	22,606	28,653	31,703	1,303	1,402

#### Appendix B.7 **Energy Consumption per Capita** at MoE Network Ends in 2001 and 2002<sup>1</sup>

 <sup>&</sup>lt;sup>1</sup> Sulaymaniyah and Erbil are not included in the data.
 <sup>2</sup> The population in 2001 is estimated from the population by Governorate in 2002 and the annual increase ratio from 1997 to 2003 in Appendix C.2.

Category	Baghdad kWh/Nos.	Middle kWh/Nos.	North kWh/Nos.	South kWh/Nos.	Total kWh/Nos.
Household	9,811	2,866	4,285	3,928	5,441
Commercial	4,743	1,215	1,725	2,254	3,248
Industrial	452,964	388,190	698,991	1,140,341	610,908
Governmental	192,224	49,003	66,086	61,873	88,103
Agricultural	73,198	15,666	22,589	16,280	19,628
Total	11,615	5,584	9,539	9,756	9,055

## Appendix B.8 Energy Consumption per Categorized Consumer in 2001<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>"North" includes Tameem, Salah al-Din, Ninewa and Dahuk. Sulaymaniyah and Erbil are not included in the data.

Governorate & Region	Summer	Winter	
Baghdad Region			
Rasafa & Suburbs	1,150	1,055	
Karkh & Suburbs	1,100	1,000	
Total Baghdad Region	2,250	2,055	
Middle Region			
Diyala	177	177	
Anbar	317	317	
Najaf	240	150	
Kerbela	135	135	
Qadissiya	147	145	
Wassit	170	170	
Babylon	188	188	
Total Middle Region	1,374	1,282	
North Region			
Tameem	160	180	
Salah al-Din	320	350	
Ninewa	600	600	
Total North Region	1,080	1,130	
South Region			
Basrah	580	550	
Muthanna	109	109	
Thi-Qar	165	165	
Missan	125	125	
Total South Region	979	949	
Total the above 4 regions	5,683	5,416	
3 Northern Governorates			
Sulaymaniyah	150	148	
Erbil	230	287	
Dahuk	290	335	
Total 3 Northern Governorates	670	770	
Grand Total	6,353	6,186	

## Appendix B.9 Regional Peak Demand for 2002 Estimated by UNDP

UNDP (ObR) data								
	2002	July 2002	1990	2002	2002	2002		
		Peak Demand in Summer	kWh/capita	Energy Demand	Energy Demand			
Governorate & Region	Population	at Distribution facilities	at Consumers' Ends	at Consumers' Ends	at T/L Network Ends	L.F.		
		(MW)	(kWh/capita)	(GWh)	(GWh)			
Baghdad Region	6,054,355	2,250	1,853	11,217	13,777	70%		
Middle Region								
Diyala	1,195,530	177	793	948	1,165	75%		
Anbar	1,193,343	317	1,067	1,274	1,564	56%		
Najaf	898,733	240	1,071	962	1,182	56%		
Kerbela	700,063	135	903	632	777	66%		
Qaddisiya	865,171	147	991	857	1,053	82%		
Wasit	883,839	170	1,142	1,009	1,240	83%		
Babylon	1,336,826	188	636	851	1,045	64%		
Total Middle Region	7,073,503	1,374	911	6,533	8,024	67%		
North Region								
Al-Tameem	829,757	160	965	801	983	70%		
Salah-Al-Din	917,169	320	1,121	1,028	1,262	45%		
Ninewa	2,382,348	600	956	2,278	2,798	53%		
Total North Region	4,129,274	1,080	1,000	4,107	5,044	53%		
South Region								
Basra	1,823,017	580	1,193	2,176	2,672	53%		
Muthanna	521,472	109	791	413	507	53%		
Thi Qar	1,435,866	165	608	873	1,072	74%		
Missan	783,288	125	846	663	814	74%		
Total South Region	4,563,644	979	882	4,124	5,065	59%		
Total the above regions	21,820,776	5,683	1,180	25,981	31,910	64%		
3 Northern Governorates	3 Northern Governorates							
Sulaimaniya	1,548,064	150	644	997	1,224	93%		
Erbil	1,298,499	230	1,141	1,481	1,819	90%		
Dohuk	785,409	290	993	780	958	38%		
Total 3 Northern Governorates	3,631,972	670	884	3,258	4,001	68%		
Grand Total	25,452,749	6,353	1,143	29,239	35,911	65%		

## Appendix B.10 Annual Load Factors for Peak Demand Estimated by UNDP

## Appendix B.11 Actual and Demand Peak Load for 15 May 2004

CPA Reporting Peak for 15 MAY 2004 / Report Date - 16 MAY 2004

Power transferred from North to Middle 750 MW. Power transferred from South to Middle 100 MW.

Governorate	Peak Load MW	мwн	Average Load MW	Demand Load MW
Baghdad	1,553	30,108	1,255	1,537
Duhok	80	1,910	80	114
Naynawa	355	8,280	345	494
Tamim	139	3,107	129	182
Salah Aldeen	210	4,712	196	248
Anbar	212	4,613	192	236
Dyala	91	2,249	94	140
Babil	95	2,249	94	137
Kirbala	80	1,775	74	107
Najaf	95	2,116	88	125
Kadsya	58	1,303	54	85
Wasit	89	229	85	119
Muthana	65	1,253	52	74
Nasirya	135	2,605	109	124
Misan	69	1,463	61	78
Basra	320	6,913	288	342
	3,646	74,885		4,142

	2004	2004	2004	2004	2004	2004	2004
		Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	Population	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
		(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region			L.F.=81.3%	LV Nw Loss=18.2%	L.F.=81%	HV+LV Nw Loss=33.1%	L.F.=81%
Baghdad Region	6,168,782	11,429	1,605	14,539	2,041	17,084	2,399
Middle Region			L.F.=78%	LV Nw Loss=18%	L.F.=78%	HV+LV Nw Loss=33%	L.F.=78%
Diyala	1,258,455	998	147	1,270	187	1,492	220
Anbar	1,275,962	1,362	200	1,732	255	2,036	300
Najaf	960,908	1,029	151	1,309	193	1,538	226
Kerbela	751,272	679	100	863	127	1,014	149
Qaddisiya	911,500	903	133	1,149	169	1,350	199
Wasit	940,800	1,074	158	1,367	201	1,606	236
Babylon	1,430,780	910	134	1,158	170	1,361	200
Total Middle Region	7,529,677	6,955	1,024	8,847	1,302	10,396	1,530
North Region			L.F.=62%	LV Nw Loss=28%	L.F.=62%	HV+LV Nw Loss=37%	L.F.=62%
Al-Tameem	865,065	835	154	1,203	221	1,327	244
Salah-Al-Din	976,705	1,095	201	1,577	290	1,740	320
Ninewa	2,527,556	2,417	445	3,484	641	3,842	707
Total North Region	4,369,326	4,346	800	6,264	1,153	6,908	1,272
South Region	•		L.F.=69%	LV Nw Loss=12%	L.F.=69%	HV+LV Nw Loss=23%	L.F.=69%
Basra	1,924,301	2,296	382	2,648	440	2,997	498
Muthanna	556,466	440	73	508	84	575	95
Thi Qar	1,520,449	924	154	1,066	177	1,206	200
Missan	826,685	700	116	807	134	913	152
Total South Region	4,827,901	4,360	725	5,028	836	5,690	946
Total the above regions	22,895,685	27,091	4,153	34,677	5,332	40,078	6,146
3 Northern Governorates			L.F.=79%	LV Nw Loss=28%	L.F.=79%	HV+LV Nw Loss=37%	L.F.=79%
Sulaymaniyah	1,594,164	1,027	148	1,479	213	1,632	235
Erbil	1,358,247	1,549	223	2,233	321	2,463	355
Dohuk	816,904	811	117	1,169	168	1,289	186
Total 3 Northern Governorates	3,769,315	3,387	488	4,881	703	5,383	775
Grand Total	26 665 000	20 479	4,641	39,559	6,035	45,461	6,921
Granu rotai	20,005,000	50,470	L.F.=75%	LV Nw Loss=20%	L.F.=75%	HV+LV Nw Loss=33%	L.F.=75%
	Targe	et(Nation wide data)→	75%	20%		33%	
	0	Difference→	0.0%	0.0%	•	0.0%	1

adjusting data for calibration
calculated data from coefficint
calculated data

	2005	2005	2005	2005	2005	2005
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=81.3%	LV Nw Loss=18.2%	L.F.=81%	HV+LV Nw Loss=32.1%	L.F.=81%
Baghdad Region	11,772	1,653	14,928	2,096	17,337	2,434
Middle Region		L.F.=78%	LV Nw Loss=18%	L.F.=78%	HV+LV Nw Loss=32%	L.F.=78%
Diyala	1,028	151	1,304	192	1,514	223
Anbar	1,403	206	1,779	262	2,066	304
Najaf	1,060	156	1,344	198	1,560	230
Kerbela	699	103	886	130	1,029	152
Qaddisiya	930	137	1,179	174	1,370	202
Wasit	1,107	163	1,403	207	1,630	240
Babylon	938	138	1,189	175	1,381	203
Total Middle Region	7,164	1,054	9,084	1,337	10,550	1,553
North Region		L.F.=62%	LV Nw Loss=28%	L.F.=62%	HV+LV Nw Loss=36%	L.F.=62%
AI-Tameem	860	158	1,232	227	1,343	247
Salah-Al-Din	1,127	208	1,616	297	1,760	324
Ninewa	2,490	458	3,569	657	3,888	716
Total North Region	4,477	824	6,417	1,181	6,991	1,287
South Region		L.F.=69%	LV Nw Loss=12%	L.F.=69%	HV+LV Nw Loss=23%	L.F.=69%
Basra	2,365	393	2,724	453	3,058	508
Muthanna	453	75	522	87	586	97
Thi Qar	952	158	1,096	182	1,231	205
Missan	721	120	830	138	932	155
Total South Region	4,491	746	5,173	860	5,807	965
Total the above regions	27,904	4,278	35,601	5,474	40,686	6,239
3 Northern Governorates		L.F.=79%	LV Nw Loss=28%	L.F.=79%	HV+LV Nw Loss=36%	L.F.=79%
Sulaymaniyah	1,057	152	1,516	218	1,651	238
Erbil	1,596	230	2,288	329	2,492	359
Dohuk	835	120	1,197	172	1,304	188
<b>Total 3 Northern Governorates</b>	3,489	502	5,001	720	5,448	784
Grand Total	21 202	4,780	40,602	6,194	46,133	7,023
Granu Totai	51,392	L.F.=75%	LV Nw Loss=20%	L.F.=75%	HV+LV Nw Loss=32%	L.F.=75%
Targe	et(Nation wide data)→	75%	20%		32%	
0	Difference→	0.0%	0.0%		0.0%	•

Annual Increase Ratios : 2004 to 2005 3%

2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7% 2015 to 2020 6%

adjusting data for calibration
calculated data from coefficint
calculated data

	2006	2006	2006	2006	2006	2006
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=78.1%	LV Nw Loss=17.3%	L.F.=78%	HV+LV Nw Loss=30.2%	L.F.=78%
Baghdad Region	12,478	1,824	15,571	2,276	17,877	2,613
Middle Region		L.F.=75%	LV Nw Loss=17%	L.F.=75%	HV+LV Nw Loss=30%	L.F.=75%
Diyala	1,090	167	1,360	208	1,561	239
Anbar	1,487	228	1,855	284	2,130	326
Najaf	1,123	172	1,401	215	1,609	246
Kerbela	741	114	925	142	1,062	163
Qaddisiya	986	151	1,230	188	1,412	216
Wasit	1,173	180	1,464	224	1,681	257
Babylon	994	152	1,240	190	1,424	218
Total Middle Region	7,593	1,163	9,475	1,452	10,879	1,667
North Region		L.F.=60%	LV Nw Loss=26%	L.F.=60%	HV+LV Nw Loss=34%	L.F.=60%
Al-Tameem	911	175	1,275	244	1,377	264
Salah-Al-Din	1,195	229	1,672	320	1,806	346
Ninewa	2,639	506	3,691	707	3,989	764
Total North Region	4,745	909	6,638	1,272	7,172	1,374
South Region	1	L.F.=66%	LV Nw Loss=11%	L.F.=66%	HV+LV Nw Loss=21%	L.F.=66%
Basra	2,507	434	2,863	495	3,187	551
Muthanna	481	83	549	95	611	106
Thi Qar	1,009	175	1,152	199	1,282	222
Missan	764	132	872	151	971	168
Total South Region	4,761	824	5,436	940	6,051	1,047
Total the above regions	29,578	4,720	37,120	5,940	41,979	6,701
3 Northern Governorates	1	L.F.=76%	LV Nw Loss=26%	L.F.=76%	HV+LV Nw Loss=34%	L.F.=76%
Sulaymaniyah	1,121	168	1,568	235	1,694	254
Erbil	1,692	254	2,366	355	2,557	383
Dohuk	885	133	1,239	186	1,338	201
Total 3 Northern Governorates	3,698	554	5,173	775	5,589	838
Grand Total	33.276	5,274	42,292	6,715	47,568	7,538
		L.F.=72.0%	LV Nw Loss=19%	L.F.=72%	HV+LV Nw Loss=30.0%	L.F.=72%
Tarqe	et (Nation wide data) $\rightarrow$	72%	19%		30%	

2,613

0.0%

#### Appendix B.12 Result of Demand Forecast

Target (Nation wide data)-Difference→

0.0%

0.0%

Annual Increase Ratios : 2004 to 2005 3%

ca	loulated data from coefficin
	calculated data

2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7%

	2007	2007	2007	2007	2007	2007
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=78.1%	LV Nw Loss=16.4%	L.F.=78%	HV+LV Nw Loss=28.2%	L.F.=78%
Baghdad Region	13,227	1,933	16,248	2,375	18,422	2,693
Middle Region		L.F.=75%	LV Nw Loss=16%	L.F.=75%	HV+LV Nw Loss=28%	L.F.=75%
Diyala	1,155	177	1,419	217	1,609	246
Anbar	1,576	241	1,936	297	2,195	336
Najaf	1,190	182	1,462	224	1,658	254
Kerbela	785	120	965	148	1,094	168
Qaddisiya	1,045	160	1,284	197	1,455	223
Wasit	1,243	190	1,527	234	1,732	265
Babylon	1,054	161	1,294	198	1,467	225
Total Middle Region	8,049	1,233	9,887	1,515	11,210	1,717
North Region		L.F.=60%	LV Nw Loss=25%	L.F.=60%	HV+LV Nw Loss=32%	L.F.=60%
Al-Tameem	966	185	1,319	253	1,412	271
Salah-Al-Din	1,267	243	1,730	331	1,852	355
Ninewa	2,797	536	3,820	732	4,089	784
Total North Region	5,030	964	6,869	1,316	7,353	1,409
South Region		L.F.=66%	LV Nw Loss=11%	L.F.=66%	HV+LV Nw Loss=20%	L.F.=66%
Basra	2,658	460	3,008	520	3,318	574
Muthanna	510	88	577	100	636	110
Thi Qar	1,069	185	1,211	209	1,335	231
Missan	810	140	917	159	1,011	175
Total South Region	5,046	873	5,712	988	6,301	1,090
Total the above regions	31,353	5,003	38,718	6,194	43,286	6,909
3 Northern Governorates		L.F.=76%	LV Nw Loss=25%	L.F.=76%	HV+LV Nw Loss=32%	L.F.=76%
Sulaymaniyah	1,188	178	1,622	243	1,737	260
Erbil	1,793	269	2,449	367	2,621	393
Dohuk	939	141	1,282	192	1,372	206
Total 3 Northern Governorates	3,920	587	5,353	802	5,730	859
Grand Total	35 373	5,591	44,071	6,997	49,016	7,768
Granu Totai	55,272	L.F.=72%	LV Nw Loss=18%	L.F.=72%	HV+LV Nw Loss=28%	L.F.=72%
Targe	et(Nation wide data)→	72%	18%		28%	
-	Difference→	0.0%	-0.1%		0.0%	

Annual Increase Ratios : 2004 to 2005 3%

adjusting data for calibration
calculated data from coefficint
calculated data

2007 to 2010 8% 2010 to 2015 7%

2005 to 2007 6%

	2008	2008	2008	2008	2008	2008
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=75.9%	LV Nw Loss=16.0%	L.F.=76%	HV+LV Nw Loss=27.2%	L.F.=76%
Baghdad Region	14,285	2,149	17,425	2,621	19,623	2,951
Middle Region		L.F.=72%	LV Nw Loss=16%	L.F.=72%	HV+LV Nw Loss=27%	L.F.=72%
Diyala	1,248	197	1,522	240	1,714	270
Anbar	1,702	268	2,076	327	2,338	369
Najaf	1,286	203	1,568	247	1,766	278
Kerbela	848	134	1,035	163	1,165	184
Qaddisiya	1,129	178	1,377	217	1,550	244
Wasit	1,343	212	1,638	258	1,845	291
Babylon	1,138	179	1,388	219	1,563	246
Total Middle Region	8,693	1,370	10,603	1,671	11,941	1,882
North Region		L.F.=58%	LV Nw Loss=24%	L.F.=58%	HV+LV Nw Loss=30%	L.F.=58%
Al-Tameem	1,043	206	1,409	278	1,500	296
Salah-Al-Din	1,368	270	1,848	364	1,968	388
Ninewa	3,021	596	4,082	805	4,345	857
Total North Region	5,433	1,071	7,339	1,447	7,814	1,541
South Region	·	L.F.=64%	LV Nw Loss=10%	L.F.=64%	HV+LV Nw Loss=19%	L.F.=64%
Basra	2,870	511	3,237	576	3,552	632
Muthanna	550	98	621	110	681	121
Thi Qar	1,155	206	1,302	232	1,429	254
Missan	874	156	986	176	1,082	193
Total South Region	5,450	970	6,146	1,094	6,745	1,201
Total the above regions	33,861	5,560	41,513	6,833	46,122	7,575
3 Northern Governorates		L.F.=74%	LV Nw Loss=24%	L.F.=74%	HV+LV Nw Loss=30%	L.F.=74%
Sulaymaniyah	1,283	198	1,733	267	1,845	285
Erbil	1,937	299	2,616	403	2,785	430
Dohuk	1,014	156	1,369	211	1,458	225
<b>Total 3 Northern Governorates</b>	4,233	653	5,719	882	6,089	939
Grand Total	20.004	6,213	47,232	7,715	52,211	8,514
Grand Total	38,094	L.F.=70%	LV Nw Loss=17.5%	L.F.=70%	HV+LV Nw Loss=27%	L.F.=70%
Targe	et(Nation wide data)→	70%	17.5%		27%	
5	Difference→	0.0%	0.0%		0.0%	'

Annual Increase Ratios :

adjusting data for calibration calculated data from coefficint calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

Appendix B.12	<b>Result of Demand Forecast</b>
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	2000	2000	2000	2000	2000	2000
	2009	2009 Deals Damard	2009	2009 Deals Demand		2009
Covernerete & Desire	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region					at P/S Sent-out Points	at P/S Sent-out Points
	(GVVN)		(GWN)		(GVVh)	
Baghdad Region		L.F.=/5.9%	LV Nw Loss=16.0%	L.F.=/6%	HV+LV Nw Loss=27.2%	L.F.=76%
Baghdad Region	15,428	2,320	18,819	2,830	21,193	3,187
Middle Region		L.F.=72%	LV Nw Loss=16%	L.F.=72%	HV+LV Nw Loss=27%	L.F.=72%
Diyala	1,347	212	1,643	259	1,851	292
Anbar	1,838	290	2,242	353	2,525	398
Najaf	1,389	219	1,694	267	1,907	301
Kerbela	916	144	1,117	176	1,258	198
Qaddisiya	1,219	192	1,487	234	1,674	264
Wasit	1,450	229	1,769	279	1,992	314
Babylon	1,229	194	1,499	236	1,688	266
Total Middle Region	9,388	1,480	11,452	1,805	12,896	2,033
North Region	· · ·	L.F.=58%	LV Nw Loss=24%	L.F.=58%	HV+LV Nw Loss=30%	L.F.=58%
AI-Tameem	1,127	222	1,522	300	1,621	320
Salah-Al-Din	1,477	291	1,996	394	2,125	419
Ninewa	3,263	643	4,408	869	4,693	925
Total North Region	5,867	1,157	7,926	1,563	8,439	1,664
South Region	•	L.F.=64%	LV Nw Loss=10%	L.F.=64%	HV+LV Nw Loss=19%	L.F.=64%
Basra	3,100	552	3,496	622	3,837	683
Muthanna	594	106	670	119	736	131
Thi Qar	1,247	222	1,407	250	1,544	275
Missan	944	168	1,065	190	1,169	208
Total South Region	5,886	1,048	6,637	1,182	7,285	1,297
Total the above regions	36,570	6,005	44,834	7,380	49,812	8,181
3 Northern Governorates	· · · ·	L.F.=74%	LV Nw Loss=24%	L.F.=74%	HV+LV Nw Loss=30%	L.F.=74%
Sulaymaniyah	1,386	214	1,872	289	1,993	307
lErbil	2.092	323	2.826	436	3.008	464
Dohuk	1.095	169	1.479	228	1.575	243
Total 3 Northern Governorates	4.572	705	6.177	952	6.576	1.014
		6.710	51.011	8.333	56.388	9,195
Grand Total	41,142	L.F.=70%	LV Nw Loss=17.5%	L.F.=70%	HV+LV Nw Loss=27%	L.F.=70%
Taroe	et (Nation wide data)→	70%	17.5%		27%	
Targe		 		l	0.00/	l
		0.0%	0.0%		0.0%	

2004 to 2005 3% 2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7% adjusting data for calibration calculated data from coefficint

2015 to 2020 6%

calculated data

	2010	2010	2010	2010	2010	2010
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=75.9%	LV Nw Loss=15.5%	L.F.=76%	HV+LV Nw Loss=26.2%	L.F.=76%
Baghdad Region	16,662	2,506	20,162	3,032	22,578	3,396
Middle Region		L.F.=72%	LV Nw Loss=16%	L.F.=72%	HV+LV Nw Loss=26%	L.F.=72%
Diyala	1,455	229	1,761	278	1,972	311
Anbar	1,985	313	2,402	379	2,690	424
Najaf	1,500	236	1,815	286	2,032	320
Kerbela	989	156	1,197	189	1,341	211
Qaddisiya	1,316	207	1,593	251	1,784	281
Wasit	1,566	247	1,895	299	2,122	335
Babylon	1,327	209	1,606	253	1,798	283
Total Middle Region	10,139	1,598	12,269	1,934	13,739	2,166
North Region		L.F.=58%	LV Nw Loss=24%	L.F.=58%	HV+LV Nw Loss=29%	L.F.=58%
Al-Tameem	1,217	240	1,624	320	1,722	340
Salah-Al-Din	1,596	315	2,130	420	2,259	445
Ninewa	3,524	695	4,703	927	4,988	984
Total North Region	6,337	1,249	8,457	1,668	8,969	1,769
South Region		L.F.=64%	LV Nw Loss=10%	L.F.=64%	HV+LV Nw Loss=18%	L.F. <b>=</b> 64%
Basra	3,348	596	3,758	669	4,108	731
Muthanna	642	114	721	128	788	140
Thi Qar	1,347	240	1,512	269	1,653	294
Missan	1,020	182	1,145	204	1,251	223
Total South Region	6,357	1,132	7,136	1,270	7,799	1,388
Total the above regions	39,495	6,485	48,024	7,904	53,085	8,719
3 Northern Governorates		L.F.=74%	LV Nw Loss=24%	L.F.=74%	HV+LV Nw Loss=29%	L.F.=74%
Sulaymaniyah	1,497	231	1,997	308	2,118	327
Erbil	2,259	348	3,015	465	3,197	493
Dohuk	1,182	182	1,578	243	1,674	258
Total 3 Northern Governorates	4,938	761	6,590	1,016	6,989	1,078
Grand Total	44 422	7,247	54,614	8,921	60,075	9,796
Grand Total	44,433	L.F.=70%	LV Nw Loss=17%	L.F.=70%	HV+LV Nw Loss=26%	L.F.=70%
Targe	et(Nation wide data)→	70%	17%		26%	
Ũ	Difference→	0.0%	-0.1%	•	0.0%	•

Annual Increase Ratios : 2004 to 2005 3%

adjusting data for calibration
calculated data from coefficint
calculated data

2007 to 2010 8% 2010 to 2015 7%

2005 to 2007 6%

	2011	2011	2011	2011	2011	2011
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=74.8%	LV Nw Loss=15.1%	L.F.=75%	HV+LV Nw Loss=25.2%	L.F.=75%
Baghdad Region	17,829	2,721	21,428	3,270	23,835	3,638
Middle Region		L.F.=71%	LV Nw Loss=15%	L.F.=71%	HV+LV Nw Loss=25%	L.F.=71%
Diyala	1,557	249	1,871	299	2,081	333
Anbar	2,124	340	2,553	408	2,840	454
Najaf	1,605	257	1,929	308	2,145	343
Kerbela	1,059	169	1,272	204	1,415	226
Qaddisiya	1,408	225	1,693	271	1,883	301
Wasit	1,676	268	2,014	322	2,241	358
Babylon	1,420	227	1,707	273	1,899	304
Total Middle Region	10,849	1,735	13,039	2,086	14,504	2,320
North Region		L.F.=57%	LV Nw Loss=23%	L.F.=57%	HV+LV Nw Loss=28%	L.F.=57%
Al-Tameem	1,302	261	1,720	344	1,814	363
Salah-Al-Din	1,707	342	2,255	451	2,379	476
Ninewa	3,771	754	4,981	997	5,254	1,051
Total North Region	6,780	1,357	8,956	1,792	9,447	1,890
South Region	•	L.F.=63%	LV Nw Loss=10%	L.F.=63%	HV+LV Nw Loss=18%	L.F.=63%
Basra	3,582	647	4,006	724	4,357	787
Muthanna	687	124	768	139	835	151
Thi Qar	1,441	260	1,612	291	1,753	317
Missan	1,091	197	1,221	220	1,328	240
Total South Region	6,802	1,229	7,607	1,374	8,274	1,494
Total the above regions	42,260	7,042	51,030	8,522	56,060	9,342
3 Northern Governorates		L.F.=73%	LV Nw Loss=23%	L.F.=73%	HV+LV Nw Loss=28%	L.F.=73%
Sulaymaniyah	1,601	251	2,115	331	2,231	349
Erbil	2,417	378	3,193	500	3,368	527
Dohuk	1,265	198	1,671	261	1,763	276
<b>Total 3 Northern Governorates</b>	5,283	827	6,979	1,092	7,362	1,152
Grand Total	17 549	7,868	58,009	9,614	63,422	10,494
Grand Total	47,545	L.F.=69%	LV Nw Loss=16.5%	L.F.=69%	HV+LV Nw Loss=25%	L.F.=69%
Targe	et(Nation wide data)→	69%	16.5%		25%	
Ũ	, Difference →	0.0%	0.0%	'	0.0%	

Annual Increase Ratios : 2004 to 2005 3%

adjusting data for calibration
calculated data from coefficint
calculated data

2007 to 2010 8% 2010 to 2015 7%

2005 to 2007 6%

Appendix B.12 Re	sult of Demand Forecast
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	2012	2012	2012	2012	2012	2012
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=73.7%	LV Nw Loss=15.1%	L.F.=74%	HV+LV Nw Loss=25.2%	L.F.=74%
Baghdad Region	19,077	2,955	22,928	3,551	25,504	3,950
Middle Region		L.F.=70%	LV Nw Loss=15%	L.F.=70%	HV+LV Nw Loss=25%	L.F.=70%
Diyala	1,666	270	2,002	325	2,227	362
Anbar	2,273	369	2,732	444	3,039	493
Najaf	1,717	279	2,064	335	2,295	373
Kerbela	1,133	184	1,361	221	1,514	246
Qaddisiya	1,507	245	1,811	294	2,015	327
Wasit	1,793	291	2,155	350	2,397	389
Babylon	1,519	247	1,826	296	2,031	330
Total Middle Region	11,609	1,885	13,952	2,265	15,519	2,519
North Region		L.F.=56%	LV Nw Loss=23%	L.F.=56%	HV+LV Nw Loss=28%	L.F.=56%
Al-Tameem	1,393	283	1,840	374	1,941	394
Salah-Al-Din	1,827	371	2,413	490	2,546	517
Ninewa	4,035	819	5,329	1,082	5,622	1,142
Total North Region	7,255	1,473	9,583	1,946	10,109	2,053
South Region		L.F.=62%	LV Nw Loss=10%	L.F.=62%	HV+LV Nw Loss=18%	L.F.=62%
Basra	3,833	703	4,287	786	4,662	855
Muthanna	735	135	822	151	894	164
Thi Qar	1,542	283	1,725	316	1,876	344
Missan	1,168	214	1,306	239	1,420	260
Total South Region	7,278	1,334	8,140	1,492	8,853	1,623
Total the above regions	45,218	7,647	54,602	9,255	59,985	10,146
3 Northern Governorates		L.F.=72%	LV Nw Loss=23%	L.F.=72%	HV+LV Nw Loss=28%	L.F.=72%
Sulaymaniyah	1,713	272	2,263	359	2,387	379
Erbil	2,586	411	3,416	542	3,604	572
Dohuk	1,354	215	1,788	284	1,886	300
Total 3 Northern Governorates	5,653	898	7,467	1,186	7,877	1,251
Crond Total	E0 974	8,545	62,070	10,440	67,862	11,397
Granu Totai	50,871	L.F.=68%	LV Nw Loss=16.5%	L.F.=68%	HV+LV Nw Loss=25%	L.F.=68%
Targe	et(Nation wide data)→	68%	16.5%		25%	
-	Difference→	0.0%	0.0%	•	0.0%	•

adjusting data for calibration
calculated data from coefficint
calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

Appendix B.12 Result of Demand Forecas
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	2013	2013	2013	2013	2013	2013
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=72.7%	LV Nw Loss=14.6%	L.F.=73%	HV+LV Nw Loss=24.2%	L.F.=73%
Baghdad Region	20,412	3,205	24,344	3,823	26,929	4,228
Middle Region		L.F.=69%	LV Nw Loss=15%	L.F.=69%	HV+LV Nw Loss=24%	L.F.=69%
Diyala	1,783	293	2,126	350	2,352	387
Anbar	2,432	400	2,901	477	3,209	528
Najaf	1,837	302	2,191	361	2,424	399
Kerbela	1,212	199	1,445	238	1,599	263
Qaddisiya	1,613	265	1,923	316	2,127	350
Wasit	1,919	316	2,288	377	2,531	417
Babylon	1,626	268	1,939	319	2,145	353
Total Middle Region	12,421	2,044	14,814	2,438	16,387	2,697
North Region		L.F.=55%	LV Nw Loss=22%	L.F.=55%	HV+LV Nw Loss=27%	L.F.=55%
Al-Tameem	1,491	307	1,946	401	2,045	421
Salah-Al-Din	1,955	402	2,552	525	2,682	<u>552</u>
Ninewa	4,317	889	5,636	1,160	5,923	1,219
Total North Region	7,762	1,598	10,134	2,086	10,650	2,192
South Region		L.F.=61%	LV Nw Loss=9%	L.F.=61%	HV+LV Nw Loss=17%	L.F.=61%
Basra	4,101	762	4,567	849	4,946	919
Muthanna	786	146	876	163	948	176
Thi Qar	1,650	307	1,838	342	1,990	370
Missan	1,250	232	1,391	259	1,507	280
Total South Region	7,787	1,447	8,671	1,612	9,392	1,745
Total the above regions	48,383	8,295	57,963	9,958	63,357	10,863
3 Northern Governorates		L.F.=71%	LV Nw Loss=22%	L.F.=71%	HV+LV Nw Loss=27%	L.F.=71%
Sulaymaniyah	1,833	295	2,393	385	2,515	405
Erbil	2,767	445	3,613	582	3,797	611
Dohuk	1,448	233	1,891	304	1,987	320
Total 3 Northern Governorates	6,049	974	7,897	1,271	8,299	1,336
Grand Total	EA 422	9,269	65,860	11,230	71,657	12,199
Granu rotai	54,432	L.F.=67%	LV Nw Loss=16%	L.F.=67%	HV+LV Nw Loss=24%	L.F.=67%
Targe	et(Nation wide data)→	67%	16%		24%	
Ũ	Difference→	0.0%	-0.1%	•	0.0%	•

adjusting data for calibration
calculated data from coefficint
calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

Appendix B.12 Re	sult of Demand Forecast
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	2014	2014	2014	2014	2014	2014
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
-	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=71.6%	LV Nw Loss=14.6%	L.F.=72%	HV+LV Nw Loss=24.2%	L.F.=72%
Baghdad Region	21,841	3,482	26,048	4,153	28,814	4,594
Middle Region		L.F.=68%	LV Nw Loss=15%	L.F.=68%	HV+LV Nw Loss=24%	L.F.=68%
Diyala	1,907	319	2,275	380	2,516	420
Anbar	2,602	435	3,104	519	3,433	574
Najaf	1,966	328	2,344	392	2,593	433
Kerbela	1,297	217	1,547	258	1,711	286
Qaddisiya	1,725	288	2,058	344	2,276	380
Wasit	2,053	343	2,449	409	2,709	453
Babylon	1,740	291	2,075	347	2,295	384
Total Middle Region	13,291	2,221	15,851	2,649	17,534	2,930
North Region		L.F.=55%	LV Nw Loss=22%	L.F.=55%	HV+LV Nw Loss=27%	L.F.=55%
Al-Tameem	1,595	333	2,082	435	2,188	457
Salah-Al-Din	2,092	437	2,731	571	2,870	600
Ninewa	4,619	966	6,030	1,261	6,337	1,325
Total North Region	8,306	1,736	10,843	2,267	11,395	2,382
South Region		L.F.=60%	LV Nw Loss=9%	L.F.=60%	HV+LV Nw Loss=17%	L.F.=60%
Basra	4,388	828	4,887	922	5,293	999
Muthanna	841	159	937	177	1,015	191
Thi Qar	1,766	333	1,966	371	2,130	402
Missan	1,337	252	1,489	281	1,612	304
Total South Region	8,333	1,572	9,278	1,751	10,049	1,896
Total the above regions	51,770	9,012	62,020	10,819	67,793	11,802
3 Northern Governorates		L.F.=70%	LV Nw Loss=22%	L.F.=70%	HV+LV Nw Loss=27%	L.F.=70%
Sulaymaniyah	1,962	321	2,561	419	2,691	440
Erbil	2,961	484	3,865	632	4,062	664
Dohuk	1,550	253	2,023	331	2,126	348
Total 3 Northern Governorates	6,472	1,058	8,450	1,381	8,880	1,452
Crand Total	E0 040	10,070	70,470	12,200	76,673	13,254
Grand Total	58,243	L.F.=66%	LV Nw Loss=16%	L.F.=66%	HV+LV Nw Loss=24%	L.F.=66%
Targe	et(Nation wide data)→	66%	16%		24%	
5	Difference→	0.0%	-0.1%	•	0.0%	•

adjusting data for calibration calculated data from coefficint calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3%

2005 to 2007 6%

Appendix B.12 Result of Demand Forecas
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	2015	2015	2015	2015	2015	2015
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=70.5%	LV Nw Loss=13.7%	L.F.=71%	HV+LV Nw Loss=23.2%	L.F.=71%
Baghdad Region	23,370	3,784	27,539	4,459	30,430	4,927
Middle Region		L.F.=67%	LV Nw Loss=14%	L.F.=67%	HV+LV Nw Loss=23%	L.F.=67%
Diyala	2,041	346	2,405	408	2,657	451
Anbar	2,785	473	3,281	557	3,626	615
Najaf	2,103	357	2,479	421	2,739	465
Kerbela	1,388	235	1,635	278	1,807	307
Qaddisiya	1,846	313	2,176	369	2,404	408
Wasit	2,197	373	2,589	439	2,861	485
Babylon	1,861	316	2,193	372	2,424	411
Total Middle Region	14,221	2,413	16,758	2,844	18,517	3,143
North Region		L.F.=54%	LV Nw Loss=21%	L.F.=54%	HV+LV Nw Loss=26%	L.F.=54%
Al-Tameem	1,707	362	2,189	465	2,306	490
Salah-Al-Din	2,238	475	2,870	609	3,024	642
Ninewa	4,943	1,049	6,338	1,346	6,678	1,418
Total North Region	8,887	1,887	11,396	2,419	12,008	2,549
South Region		L.F.=60%	LV Nw Loss=9%	L.F.=60%	HV+LV Nw Loss=16%	L.F.=60%
Basra	4,696	900	5,192	995	5,615	1,076
Muthanna	900	173	995	191	1,077	206
Thi Qar	1,889	362	2,089	400	2,260	433
Missan	1,431	274	1,582	303	1,711	328
Total South Region	8,916	1,709	9,858	1,889	10,662	2,043
Total the above regions	55,394	9,793	65,550	11,612	71,617	12,662
3 Northern Governorates		L.F.=69%	LV Nw Loss=21%	L.F.=69%	HV+LV Nw Loss=26%	L.F.=69%
Sulaymaniyah	2,099	348	2,692	447	2,836	471
Erbil	3,168	526	4,063	674	4,281	711
Dohuk	1,658	275	2,127	353	2,241	372
Total 3 Northern Governorates	6,926	1,150	8,881	1,474	9,358	1,554
Grand Total	63 330	10,943	74,431	13,086	80,975	14,216
Grand Total	02,320	L.F.=65%	LV Nw Loss=15%	L.F.=65%	HV+LV Nw Loss=23%	L.F.=65%
Targe	et(Nation wide data)→	65%	15%		23%	
Ũ	Difference→	0.0%	0.0%	•	0.0%	•

I	adjusting data for calibration
ĺ	calculated data from coefficint
I	calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

Appendix B.12 Result of Demand Forecas
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	2016	2016	2016	2016	2016	2016
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=71.6%	LV Nw Loss=13.3%	L.F.=72%	HV+LV Nw Loss=22.2%	L.F.=72%
Baghdad Region	24,772	3,950	29,007	4,625	31,841	5,077
Middle Region		L.F.=68%	LV Nw Loss=13%	L.F.=68%	HV+LV Nw Loss=22%	L.F.=68%
Diyala	2,163	361	2,533	423	2,781	465
Anbar	2,952	493	3,456	578	3,794	634
Najaf	2,230	373	2,611	436	2,866	479
Kerbela	1,471	246	1,722	288	1,891	316
Qaddisiya	1,957	327	2,292	383	2,515	420
Wasit	2,329	389	2,727	456	2,993	500
Babylon	1,973	330	2,310	386	2,536	424
Total Middle Region	15,074	2,519	17,651	2,950	19,376	3,238
North Region		L.F.=55%	LV Nw Loss=20%	L.F.=55%	HV+LV Nw Loss=25%	L.F.=55%
Al-Tameem	1,809	378	2,298	480	2,408	503
Salah-Al-Din	2,372	496	3,013	630	3,158	660
Ninewa	5,239	1,095	6,654	1,391	6,974	1,458
Total North Region	9,421	1,969	11,964	2,501	12,539	2,621
South Region		L.F.=60%	LV Nw Loss=9%	L.F.=60%	HV+LV Nw Loss=16%	L.F.=60%
Basra	4,977	939	5,483	1,035	5,902	1,114
Muthanna	954	180	1,051	198	1,132	214
Thi Qar	2,003	378	2,206	416	2,375	448
Missan	1,516	286	1,671	315	1,798	339
Total South Region	9,451	1,783	10,412	1,965	11,207	2,115
Total the above regions	58,718	10,221	69,034	12,040	74,963	13,050
3 Northern Governorates		L.F.=70%	LV Nw Loss=20%	L.F.=70%	HV+LV Nw Loss=25%	L.F.=70%
Sulaymaniyah	2,225	364	2,826	462	2,962	484
Erbil	3,358	549	4,265	697	4,470	731
Dohuk	1,758	287	2,232	365	2,340	382
Total 3 Northern Governorates	7,341	1,200	9,323	1,524	9,771	1,597
Grand Total	66 050	11,421	78,357	13,564	84,734	14,647
Grand Total	00,059	L.F.=66%	LV Nw Loss=14.5%	L.F.=66%	HV+LV Nw Loss=22%	L.F.=66%
Targe	et(Nation wide data)→	66%	14.5%		22%	
	Difference→	0.0%	0.0%	•	0.0%	

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alculated data from coefficin	t
calculated data	

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

Appendix B.12	<b>Result of Demand Forecast</b>
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	2017	2017	2017	2017	2017	2017
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=72.7%	LV Nw Loss=13.3%	L.F.=73%	HV+LV Nw Loss=22.2%	L.F.=73%
Baghdad Region	26,258	4,123	30,747	4,828	33,751	5,300
Middle Region		L.F.=69%	LV Nw Loss=13%	L.F.=69%	HV+LV Nw Loss=22%	L.F.=69%
Diyala	2,293	377	2,685	442	2,947	485
Anbar	3,129	515	3,664	603	4,022	662
Najaf	2,363	389	2,767	455	3,038	500
Kerbela	1,559	257	1,826	300	2,004	330
Qaddisiya	2,074	341	2,429	400	2,666	439
Wasit	2,468	406	2,890	476	3,173	522
Babylon	2,092	344	2,449	403	2,688	442
Total Middle Region	15,979	2,630	18,710	3,079	20,538	3,380
North Region		L.F.=55%	LV Nw Loss=20%	L.F.=55%	HV+LV Nw Loss=25%	L.F.=55%
Al-Tameem	1,918	395	2,435	501	2,552	525
Salah-Al-Din	2,515	518	3,194	657	3,347	689
Ninewa	5,553	1,143	7,053	1,452	7,392	1,522
Total North Region	9,986	2,056	12,682	2,611	13,292	2,736
South Region		L.F.=61%	LV Nw Loss=9%	L.F.=61%	HV+LV Nw Loss=16%	L.F.=61%
Basra	5,276	981	5,812	1,080	6,256	1,163
Muthanna	1,012	188	1,114	207	1,199	223
Thi Qar	2,123	395	2,339	435	2,518	468
Missan	1,607	299	1,771	329	1,906	354
Total South Region	10,018	1,862	11,036	2,051	11,880	2,208
Total the above regions	62,241	10,670	73,176	12,569	79,460	13,624
3 Northern Governorates		L.F.=71%	LV Nw Loss=20%	L.F.=71%	HV+LV Nw Loss=25%	L.F.=71%
Sulaymaniyah	2,358	380	2,995	482	3,139	505
Erbil	3,560	573	4,521	728	4,738	763
Dohuk	1,863	300	2,366	381	2,480	399
<b>Total 3 Northern Governorates</b>	7,782	1,253	9,882	1,591	10,358	1,667
Crond Total	70.000	11,923	83,058	14,160	89,818	15,291
Granu rotar	10,022	L.F.=67%	LV Nw Loss=14.5%	L.F.=67%	HV+LV Nw Loss=22%	L.F.=67%
Targe	et(Nation wide data)→	67%	14.5%		22%	
5	Difference→	0.0%	0.0%	I	0.0%	•

adjusting data for calibration
calculated data from coefficint
calculated data

2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3%

	2018	2018	2018	2018	2018	2018
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=73.7%	LV Nw Loss=12.8%	L.F.=74%	HV+LV Nw Loss=21.2%	L.F.=74%
Baghdad Region	27,834	4,311	32,355	5,012	35,322	5,471
Middle Region		L.F.=70%	LV Nw Loss=13%	L.F.=70%	HV+LV Nw Loss=21%	L.F.=70%
Diyala	2,431	395	2,825	459	3,085	501
Anbar	3,317	538	3,855	626	4,209	683
Najaf	2,505	407	2,912	473	3,179	516
Kerbela	1,653	268	1,921	312	2,097	340
Qaddisiya	2,199	357	2,556	415	2,790	453
Wasit	2,617	425	3,042	494	3,320	539
Babylon	2,217	360	2,577	418	2,813	457
Total Middle Region	16,937	2,750	19,689	3,196	21,494	3,489
North Region		L.F.=56%	LV Nw Loss=20%	L.F.=56%	HV+LV Nw Loss=24%	L.F.=56%
Al-Tameem	2,033	413	2,553	518	2,666	541
Salah-Al-Din	2,666	541	3,348	680	3,496	710
Ninewa	5,887	1,195	7,394	1,501	7,720	1,568
Total North Region	10,585	2,150	13,295	2,700	13,882	2,819
South Region		L.F.=62%	LV Nw Loss=8%	L.F.=62%	HV+LV Nw Loss=15%	L.F.=62%
Basra	5,593	1,025	6,135	1,125	6,577	1,206
Muthanna	1,072	197	1,176	216	1,261	231
Thi Qar	2,250	413	2,469	453	2,646	485
Missan	1,704	312	1,869	343	2,004	367
Total South Region	10,619	1,947	11,649	2,136	12,488	2,289
Total the above regions	65,975	11,157	76,988	13,043	83,186	14,069
3 Northern Governorates		L.F.=72%	LV Nw Loss=20%	L.F.=72%	HV+LV Nw Loss=24%	L.F.=72%
Sulaymaniyah	2,500	397	3,140	499	3,279	521
Erbil	3,773	599	4,739	753	4,949	786
Dohuk	1,975	314	2,481	394	2,590	411
Total 3 Northern Governorates	8,248	1,310	10,360	1,645	10,818	1,718
Crand Total	74 004	12,467	87,348	14,689	94,004	15,787
Grand Total	/4,224	L.F.=68%	LV Nw Loss=14%	L.F.=68%	HV+LV Nw Loss=21%	L.F.=68%
Targe	et(Nation wide data)→	68%	14%		21%	
	Difference→	0.0%	0.0%	•	0.0%	

Annual Increase Ratios :

adjusting data for calibration calculated data from coefficint calculated data

2007 to 2010 8% 2010 to 2015 7%

2004 to 2005 3% 2005 to 2007 6%

	2019	2019	2019	2019	2019	2019
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=74.8%	LV Nw Loss=12.8%	L.F.=75%	HV+LV Nw Loss=21.2%	L.F.=75%
Baghdad Region	29,504	4,503	34,296	5,234	37,442	5,714
Middle Region		L.F.=71%	LV Nw Loss=13%	L.F.=71%	HV+LV Nw Loss=21%	L.F.=71%
Diyala	2,577	412	2,995	479	3,270	523
Anbar	3,516	562	4,087	654	4,461	714
Najaf	2,655	425	3,087	494	3,370	539
Kerbela	1,752	280	2,036	326	2,223	356
Qaddisiya	2,331	373	2,709	433	2,958	473
Wasit	2,774	444	3,224	516	3,520	563
Babylon	2,350	376	2,732	437	2,982	477
Total Middle Region	17,954	2,872	20,870	3,338	22,784	3,644
North Region		L.F.=57%	LV Nw Loss=20%	L.F.=57%	HV+LV Nw Loss=24%	L.F.=57%
Al-Tameem	2,155	431	2,706	542	2,826	565
Salah-Al-Din	2,825	565	3,549	710	3,706	741
Ninewa	6,240	1,249	7,837	1,568	8,184	1,637
Total North Region	11,220	2,245	14,093	2,820	14,715	2,944
South Region		L.F.=63%	LV Nw Loss=8%	L.F.=63%	HV+LV Nw Loss=15%	L.F.=63%
Basra	5,928	1,071	6,503	1,175	6,971	1,259
Muthanna	1,137	205	1,247	225	1,337	241
Thi Qar	2,385	431	2,617	473	2,805	507
Missan	1,806	326	1,981	358	2,124	384
Total South Region	11,256	2,033	12,348	2,231	13,237	2,391
Total the above regions	69,934	11,653	81,607	13,623	88,177	14,694
3 Northern Governorates		L.F. <b>=7</b> 3%	LV Nw Loss=20%	L.F.=73%	HV+LV Nw Loss=24%	L.F.=73%
Sulaymaniyah	2,650	415	3,328	521	3,475	544
Erbil	4,000	626	5,024	786	5,246	821
Dohuk	2,094	328	2,630	411	2,746	430
Total 3 Northern Governorates	8,743	1,368	10,982	1,718	11,467	1,794
Crand Total	70 677	13,021	92,589	15,341	99,644	16,488
Granu Total	18,677	L.F.=69%	LV Nw Loss=14%	L.F.=69%	HV+LV Nw Loss=21%	L.F.=69%
Targe	et(Nation wide data)→	69%	14%		21%	
5	Difference→	0.0%	0.0%	•	0.0%	I

Annual Increase Ratios :

2004 to 2005 3% 2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7% adjusting data for calibration calculated data from coefficint

2015 to 2020 6%

calculated data

	2020	2020	2020	2020	2020	2020
	Energy Demand	Peak Demand	Energy Demand	Peak Demand	Energy Demand	Peak Demand
Governorate & Region	at Consumers' Ends	at Consumers' Ends	at 132kV S/S Ends	at 132kV S/S Ends	at P/S Sent-out Points	at P/S Sent-out Points
	(GWh)	(MW)	(GWh)	(MW)	(GWh)	(MW)
Baghdad Region		L.F.=75.9%	LV Nw Loss=11.9%	L.F.=76%	HV+LV Nw Loss=20.2%	L.F.=76%
Baghdad Region	31,274	4,704	35,938	5,405	39,191	5,894
Middle Region		L.F.=72%	LV Nw Loss=12%	L.F.=72%	HV+LV Nw Loss=20%	L.F.=72%
Diyala	2,731	431	3,138	495	3,422	539
Anbar	3,726	587	4,282	675	4,670	736
Najaf	2,815	444	3,235	510	3,527	556
Kerbela	1,857	293	2,134	336	2,327	367
Qaddisiya	2,471	389	2,839	448	3,096	488
Wasit	2,940	463	3,378	533	3,684	581
Babylon	2,491	393	2,862	451	3,122	492
Total Middle Region	19,031	3,000	21,869	3,447	23,848	3,759
North Region		L.F.=58%	LV Nw Loss=18%	L.F.=58%	HV+LV Nw Loss=23%	L.F.=58%
Al-Tameem	2,284	450	2,820	556	2,952	582
Salah-Al-Din	2,995	591	3,698	729	3,871	763
Ninewa	6,614	1,304	8,166	1,610	8,549	1,686
Total North Region	11,893	2,345	14,683	2,895	15,372	3,031
South Region		L.F.=64%	LV Nw Loss=8%	L.F.=64%	HV+LV Nw Loss=14%	L.F.=64%
Basra	6,284	1,119	6,846	1,219	7,329	1,305
Muthanna	1,205	214	1,313	234	1,405	250
Thi Qar	2,529	450	2,755	490	2,949	525
Missan	1,914	341	2,086	371	2,233	397
Total South Region	11,931	2,124	12,999	2,314	13,916	2,477
Total the above reqions	74,130	12,173	85,489	14,062	92,327	15,162
3 Northern Governorates		L.F.=74%	LV Nw Loss=18%	L.F.=74%	HV+LV Nw Loss=23%	L.F.=74%
Sulaymaniyah	2,809	433	3,468	535	3,631	560
Erbil	4,240	654	5,234	807	5,480	845
Dohuk	2,219	342	2,740	422	2,868	442
Total 3 Northern Governorates	9,268	1,429	11,442	1,764	11,979	1,847
Grand Total	83 308	13,602	96,931	15,826	104,305	17,009
Grand Total	03,390	L.F.=70%	LV Nw Loss=13%	L.F.=70%	HV+LV Nw Loss=20%	L.F.=70%
Targe	et(Nation wide data)→	70%	13%		20%	
	Difference→	0.0%	0.0%		0.0%	
Annual Increase Ratios :						

2004 to 2005 3% 2005 to 2007 6% 2007 to 2010 8% 2010 to 2015 7%

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