Electric Power 2005 in Chicago

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Iraq

IRAQ's ELECTRICAL SYSTEM
(STATUS & FUTURE PLAN)

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IRAQ's ELECTRICAL SYSTEM A QUICK HISTORICAL REVIEW

Electricity Background

- Installed Generation Capacity : 9700 MW.
- No. of Installed Unit : 142
- Peak Demand (Summer 2004): 6860 MW
- Generation / Demand : (50 – 75) %
- Daily load shedding : (6-12) hours
- Access of Electricity : 80% of population

ELECTRICITY BACKGROUND

Summary Status of Load Distribution

Households Customer : (80%) of number of consumer consumed (48%) of total load

Industry Customer :(0.5%) of number of consumer consumed (29%) of total load.

Governmental Customer : (1.5 %) of number of consumer consumed (13%) of total load

Commercial Customer : (16%) of number of consumer, consumed (6%) of total load

Agricultural Customer : (2%) of number of consumer consumed (4%) of total load

ELECTRICITY BACKGROUND

Summary Status of Load Distribution

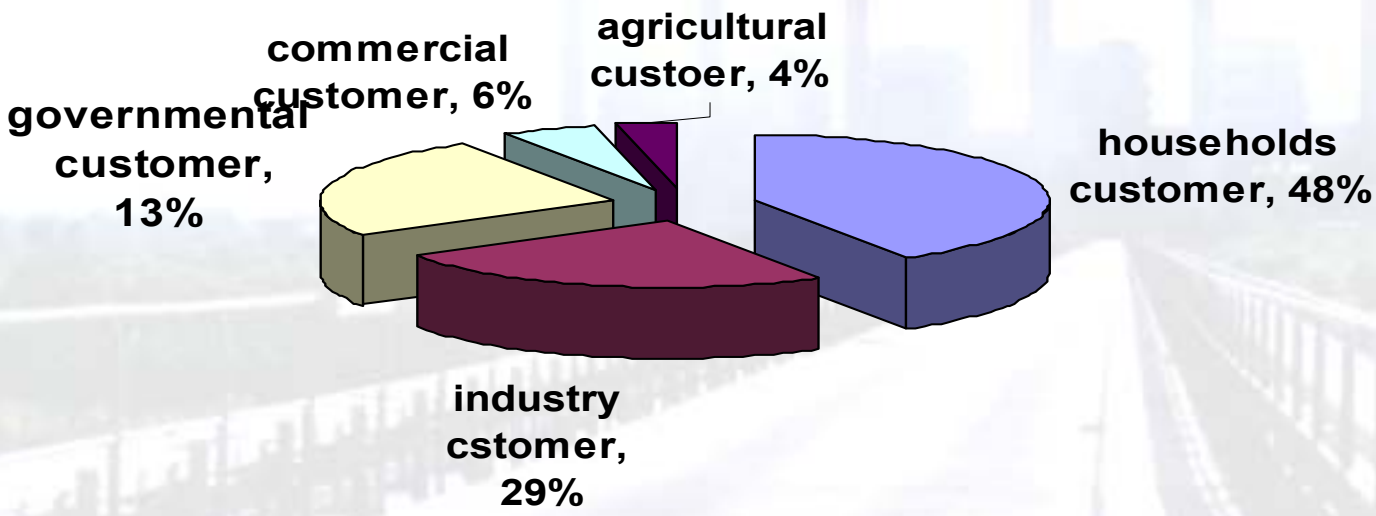
Baghdad Consumption: (40%) of total load

Basrah Consumption : (10%) of total load

Mousel Consumption :(9%) of total load

Other Governorates Consumption : (41%) of total load

Load Distribution

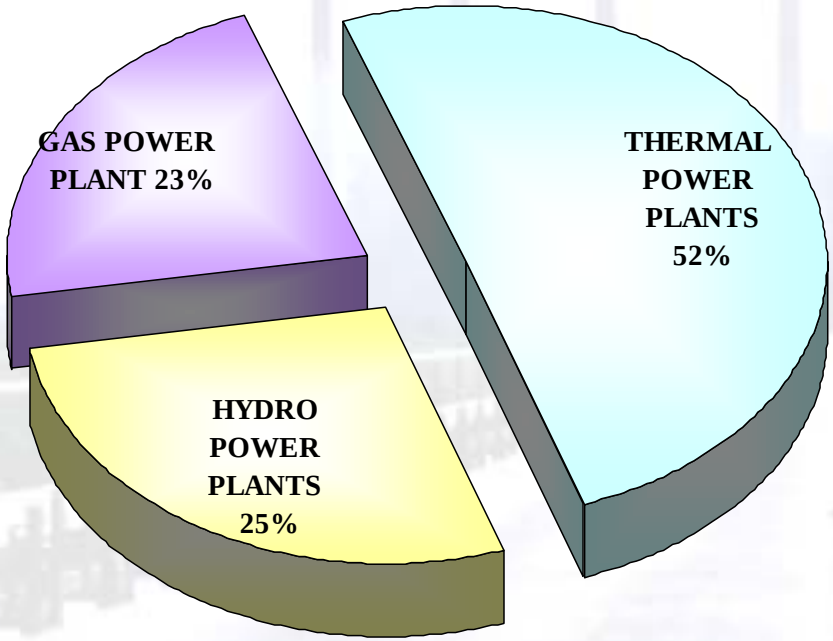


EXISTING POWER SYSTEM IN IRAQ
POWER PLANTS

Original Installed Capacity & No. of Units

Existing Power Projects	Steam P. Plants			Gas Turbine P. Plants			Hydro P. Plants			Grand Total		
	Plants	Units	Cap. MW	Plants	Units	Cap. MW	Plants	Units	Cap. MW	Plants	Units	Cap. MW
Middle Region	3	14	2195	5	21	766	4	19	814	12	54	3775
Southern Region	3	10	1440	2	6	292	-	-	-	5	16	1732
Northern Region	2	10	1380	6	44	1150	5	18	1663	13	72	4193
TOTAL	8	34	5015	13	71	2208	9	37	2477	30	142	9700

Installed Capacity



EXISTING POWER SYSTEM IN IRAQ

T&D Network

Description		Transmission		Distribution	
		400 kV	132 kV	33 kV	11 kV
Sub station	No.s	19	184	527	75900
	Lines (Nos.)	31	397	809	3803
	Length (km)	3781	13579	12292	70802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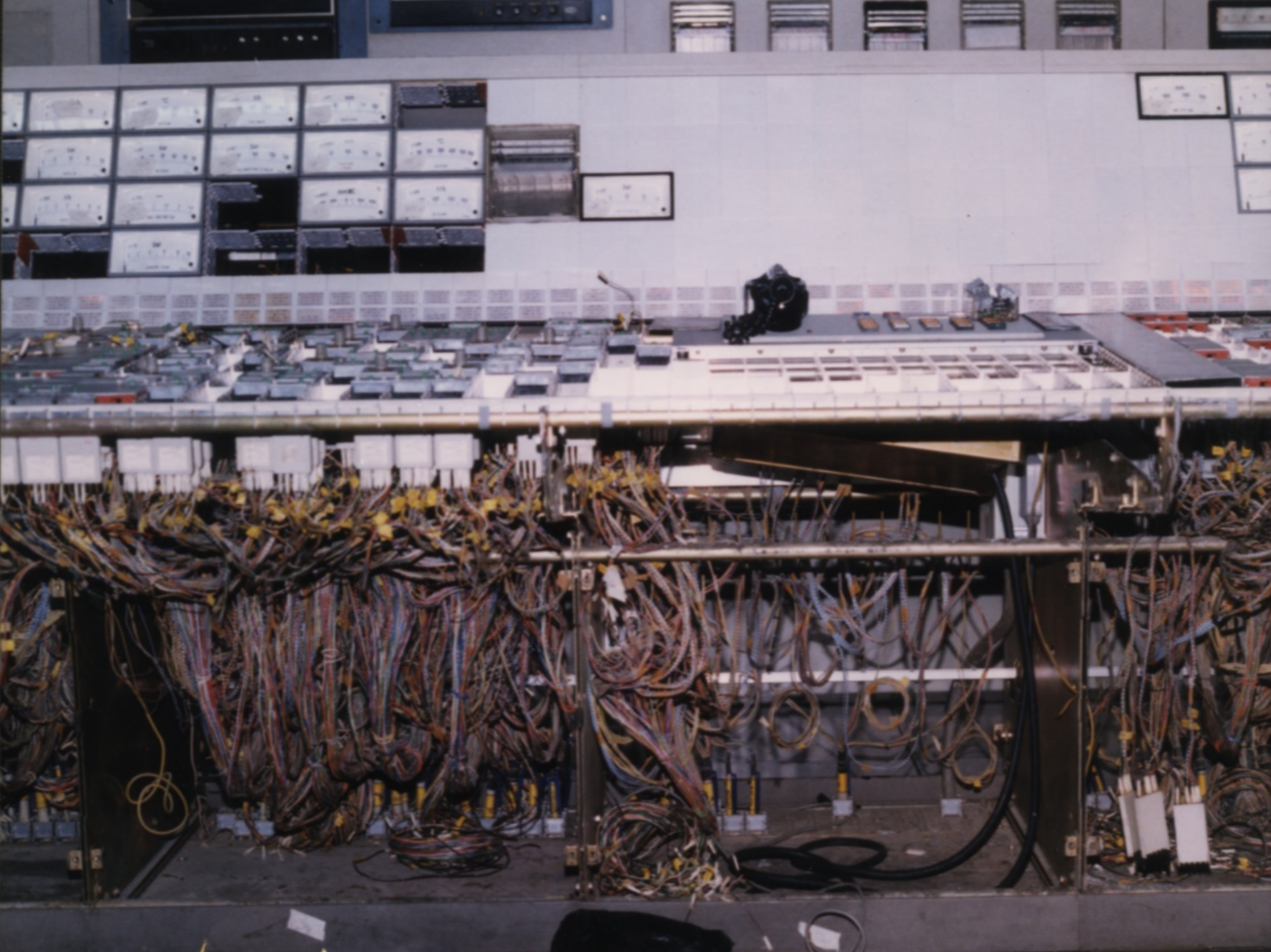

TECHNICAL CHALLENGES

- **Proper Fuel Availability**
- **Aging of Electrical System**
- **Spare Parts Availability**
- **Poor Quality Control Practice**
- **Lack of Training**

NON-TECHNICAL CHALLENGES

Sabotage

Looting

Security

War Damages

FORCASTED DEMAND

JANUARY 2004	5500 MW
SUMMER 2004	7000 MW
PEAK 2005	8000 MW
PEAK 2006	10 000 MW

ACHIEVMENTS
TWO YEARS AFTER THE WAR

-Restoring Damaged & looted Transmission Systems

- Generation back to 5000MW peak

-Interconnection with Turkey and Iran

-Starting Rehabilitation program for Major thermal power plants (Daura)

-Intensive maintenance program for Gas units

ACHIEVMENTS
TWO YEARS AFTER THE WAR (Contd.)

-Conversion of gas turbines fuel to crude and HFO at (Qudus and Baiji gas power plant)

-RFP for 3 BOO projects + 2 additional Boo's in process - Total Capacity of 1000MW

-Installation of new mobile gas turbines

-Preparing Draft Master (Bearing point)

-Starting 500 MW gas turbine project in Al-Musaib south of Baghdad

-Starting 340 MW Diesel Engine project in Samara North of Baghdad.

Status of Rehabilitated Plants

Power Station	No.units & installed capacity	REHABILITATION							
		first year		second year		third year		fourth year	
		No. of units	the fund (M) USD	No. of units	the fund (M) USD	No. of units	the fund (M) USD	No. of units	the fund (M) USD
OLD MULLA	12 * 20	5	26.25	7	36.75	–	–	–	–
NEW MULLA	6 * 37	3	27	3	27	–	–	–	–
NAJAF	3 * 63	–	–	2	48	1	24	–	–
HILLA	5 * 20	2	12	2	12	–	–	–	–
KHOR	4 * 63	2	48	–	–	1	24	1	24
DOURA	4 * 37.5	1	12	2	24	1	12	–	–
MOSUL	12 * 20	3	15	3	15	3	15	3	15
TAJI	7 * 20	3	18	4	24	–	–	–	–
SHUAIBA	2 * 20	1	6	1	6	–	–	–	–
DIBIS	3 * 37.5	1	12	1	12	1	12	–	–
SUM			176.25		204.75		87		39

Status of Rehabilitated Plants (Contd.)

			REHABILITATION							
Power Station	No.units & installed capacity	No. of forced outage units	first year		second year		third year		fourth year	
			No. of units	the fund (M) USD	No. of units	the fund (M) USD	No. of units	the fund (M) USD	No. of units	the fund (M) USD
BAIJI	6 * 220	1	2	138	1	88	2	176	1	88
DOURA	4 * 160	2	2 Units under rehb.	-	2	128	-	-	-	-
BAG.S	4 * 155 2 * 67.5	2	2	62	2	54	1	22	1	22
MUSSAIB	4 * 300	-	unit No.2 control system rehabilitation	9.1	boiler unit No.1 control of unit No.1	japanees grant 23.4	2	120	1	120
NASS.	4 * 210	-	-	-	-	-	2	168	2	168
NAJBY.	2 * 100 each unit consist of two boiler	one boiler	one boiler	19	-	-	1	40	1	40
HARTHA	4 * 200	2	2	160	-	-	1	80	1	80
SUM				388.1		293.4		606		518

FUTURE PLANNED PROJECTS

Investment Requirements For (2005-2007)

S.N	Source of Investment	No. of Projects or Sectors	Estimated Budget M$
1	USA GRANT	441 P	4033
2	JAPAN GRANT- VIA JICA	4 P	232
3	JAPAN GRANT – VIA UNDP	5 p	89
4	JAPAN Soft Loan – VIA JBIC & Other	10 p	2990
5	WORLD BANK (IDA)	9 P	124
6	IRAQI INVESTMENT BUDGET	3×10 p	6000
	TOTAL		13468

* P: Project

USA GRANT

Projects of Electricity Sectors

Electric Sector	Project	Cost $
- GENERATION	14	1 595 861 746
- TRANSMISSION	43	1 492 500 000
- DISTRIBUTION	383	835 000 000
-CONTROL & COMUNICATION	1	110 000 000
TOTAL	*441*	*4 033 361 746*

Electricity Projects on Japan Grant- Aid JICA Projects

(Bilateral Channel)

S. N	Project	Allocated Budget MUSD	Status
1	Taji GTP (Phase-1) Replacement of Four units by new units (4×25MW)	66	Detail design stage.- Scope of work has been - reduced to 3 units, cost assessment to be submitted.
2	Mosul GTP (Phase-1) Replacement of Two units by new units (2×25MW)	42	Detail design stage
3	Mosul HPP no.1 (phase -1) rehabilitation of existing units (4×187MW)	52	Detail design stage
4	Supply & Installation of 23 no. Mobile substation of 132/33kV & 132/11kV (25MVA)	72	Supply contract has been signed with Tomen Co.
Total		232	

Electricity Projects on Japan Grant Through (UNDP)

S.N	Project	Allocated Budget MUSD	Status
1	Rehabilitation of three units in Taji GTS (phase-2) (3×20MW)	25.9	In progress
2	Rehabilitation of Two units in Mosul GTS (phase-2) (2×20MW)	17.6	In progress
3	Rehabilitation of Two units in Hartha TPS (2×200MW)	17.8	In progress
4	Rehabilitation of Iraq National Dispatch Center (NDC) stage 2	11.9	In progress
5	Rehabilitation of Unit No.1 of the existing AL-Mussayab (300MW)	15.5	In progress
Total		88 725 288	

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Electricity Candidate Projects on Japan Soft Loan

S.N	Sector	Estimated Cost MUSD
1	**Generation:-** Design, supply & installation of CCGT to the existing SCGT - Kirkuk (260MW + 65MW) - Mussayab (10×50MW) - Quds (4×123.5MW)	200
2	Supply & Installation of New Thermal Power Station TPS (4×300MW) in one of the following locations - Tarmiya (North of Baghdad) - Medain (South-East of Baghdad) - Basrah	750
3	Supply & Installation of New Compound Cycle Power Plant (4×123.5MW) with all auxiliaries necessary for operation in the southern region	500
4	Supply & Installation of two new units (2×300MW) as an extension for the existing Thermal Power Plant (4×300MW) at AL-Mussayab at Babylon Governorate	400
5	Supply & Installation of Four Gas Turbine Units (4×25MW) as an extension for the existing Taji Gas Power Station	100
6	Supply & Installation of Two Gas Turbine Units (2×25MW) as an extension for the existing Mosul Gas Power Station	60
7	**Transmission:-** Rehabilitation & New Installation for the Transmission Network as follows: - Supply of new transmission lines & substation for 400kV & 132kV in the North, South & Middle Region.	300

Electricity Candidate Projects on Japan Soft Loan

S.N	Sector	Estimated Cost MUSD
	- Rehabilitation of the existing network in the North, South & Middle Region - Supply of equipment & material (Transformers Circuit Breakers, Cable Terminals, Towers, Transformer Oils …etc)	
8	**Communication & Control :-** Rehabilitation & supply of material as follows: - Reconstruction of the three Regional Control Centers [Southern (Basrah), North (Kirkuk) & Central (Baghdad)] - Reconstruction of Iraq National Dispatch Control Center. - Supply of RTU, mini SCADA for the existing network (all Governorates).	125
9	**Distribution :-** Rehabilitation & supply of material for distribution network as follows:- - Rehabilitation of old network and complete change of the existing O.H. old network Baghdad City (karkh and Rusafa) with new underground and/or twisted cables) - Supply of material needed for network includes:- ❑ Substations 33/11 kV. ❑ O.H. lines network with accessories. ❑U.G cables network with accessories ❑Street lighting network with accessories ❑Transformers, Circuit Breakers.	300 200

Electricity Candidate Projects on Japan Soft Loan

S.N	Sector	Estimated Cost MUSD
10	**Maintenance :-** **Rehabilitation and extension of the central workshop at Taji GPS:-** **- Develop existing workshop.** **- Adding new tool room workshop.** **- Adding welding techniques.** **- Adding inspection laboratories.** **- Adding forging / not rolling casting workshop.** **- Adding Logistic facilities.** **- Supply of special tools for frame 5 rotor**	**30**
Total		**2,990**

Electricity Projects on World Bank (IDA) Loan

S.N	Title	Estimated Cost MUSD
	Generation:-	
1	Supply of spare parts for AL-Quds GTS (to maintain plant operation)	10.6
2	Supply of spare parts for AL-Taji GTS (to maintain plant operation)	1.9
	Transmission:-	
3	Supply of 132/33/11kV Transformers to substitute the damaged units due overload conditions	12.9
4	Completion of construction of Mosul Mansoor Substation 132/33/11kV (the S/S was subjected to looting & damages)	1.9
	Distribution:-	
5	Supply of Mobile substation 33/11kV 10 units of 16 MVA & 5 units of 10MVA.	6.5
6	Rehabilitation of the National Network consisting of Supply of material required for 33kV & 11kV network	39.2
	General:-	
7	Supply of material, equipment & furniture for the training centers at Baghdad & Mosul	17.5

Electricity Projects on World Bank (IDA) Loan

S.N	Title	Estimated Cost MUSD
8	Supply of Mobile cranes, low loaders, truck tankers, maintenance tools safety facilities and	17.7
9	**Capacity Building:-** **Provide Technical Assistance and Capacity Building in the following areas:** ❑ **Project Management & Planning.** ❑ **Engineering Support.** ❑ **Human Resources training.** ❑ **Accounting & management information system.** ❑ **Studies (Metering, Billing, Tariff.** ❑ **Energy Saving & Renewable Energy.** ❑ **Privatization (BOO & BOT).** ❑ **Feasibility Studies.**	15
Total		**123 200 000**

Expected Iraqi Investment Budget (2005-2007)

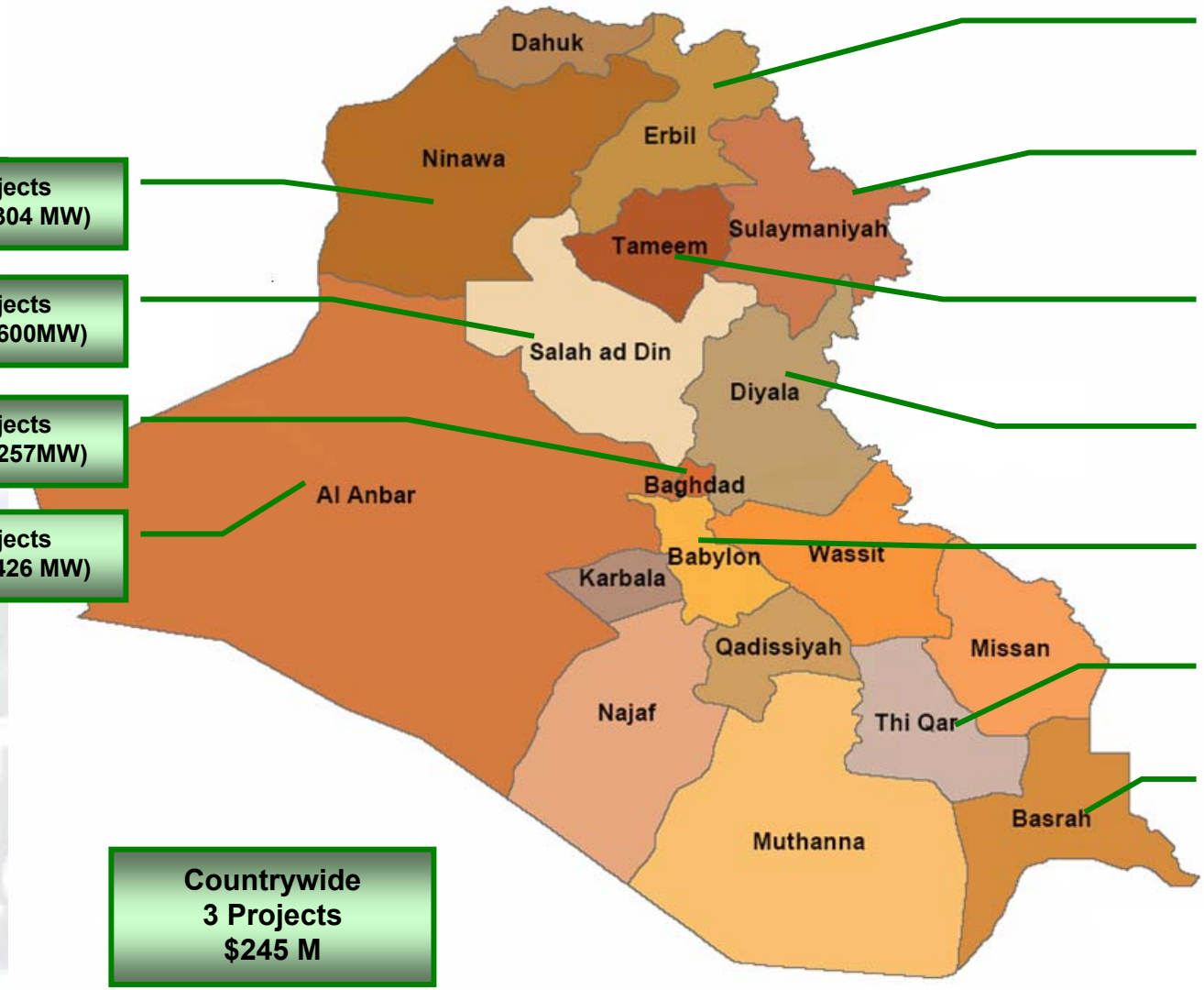
S.N	Project Title	Estimated Annual Investment Budget M$
1	Rehabilitation & Upgrading of the Distribution Network	190
2	Rehabilitation & Upgrading of the Transmission Network	110
3	Rehabilitation & Upgrading of the production Section	230
4	Modification & Upgrading of the communication network & dispatch centers (Communication & SCADA)	10
5	New Generation Projects:- (Salah Al-deen, Wassit, AL-Shimal, AL-Anbar, AL-Yosifiyah Thermal Power Station & Rehabilitation of the existing power plant)	1100
6	New Transmission Projects	250
7	Upgrade of the maintenance Workshop	10
8	Training Facilities	35

Expected Iraqi Investment Budget (2005-2007) (Contd.)

S.N	Project Title	Estimated Annual Investment Budget M$
9	Ministry Building	50
10	Electrical Power System Security	15
Total		**2000**

GENERATION

Total Sub-Sector Program
$2,777 M (3554 MW)

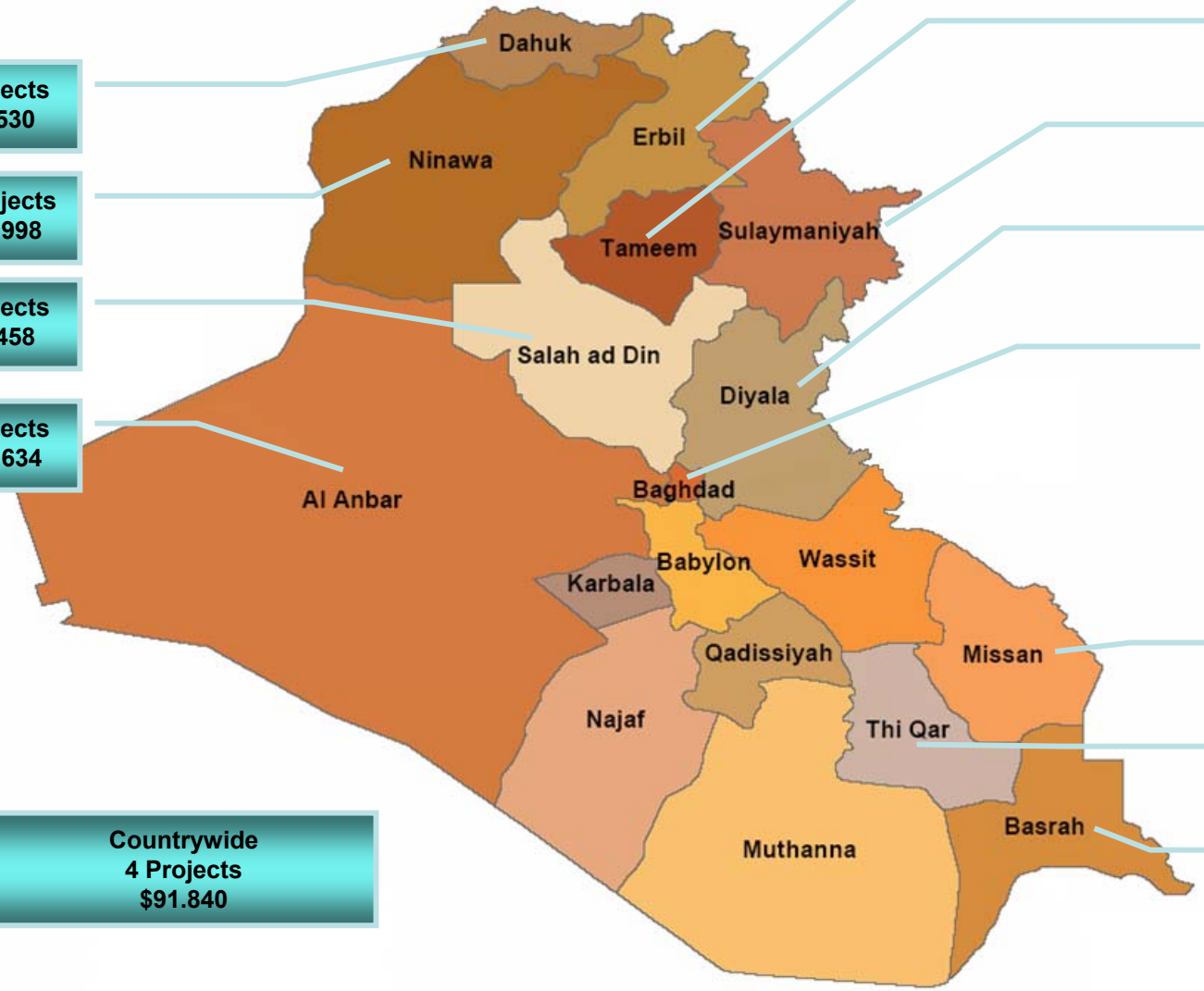


- 1 Project, $169 M (188MW)
- 3 Projects, $266 M (304 MW)
- 1 Project, $169 M (188 MW)
- 2 Projects, $198 M (600MW)
- 3 Projects, $50 M (101 MW)
- 3 Projects, $358 M (257MW)
- 1 Project, $507 M (500 MW)
- 2 Projects, $304 M (426 MW)
- 2 Projects, $39 M (170 MW)
- 1 Project, $33 M (150 MW)
- 3 Projects, $439 M (670 MW)

Countrywide
3 Projects
$245 M

TRANSMISSION

Total Sub-sector Program
$1,499M

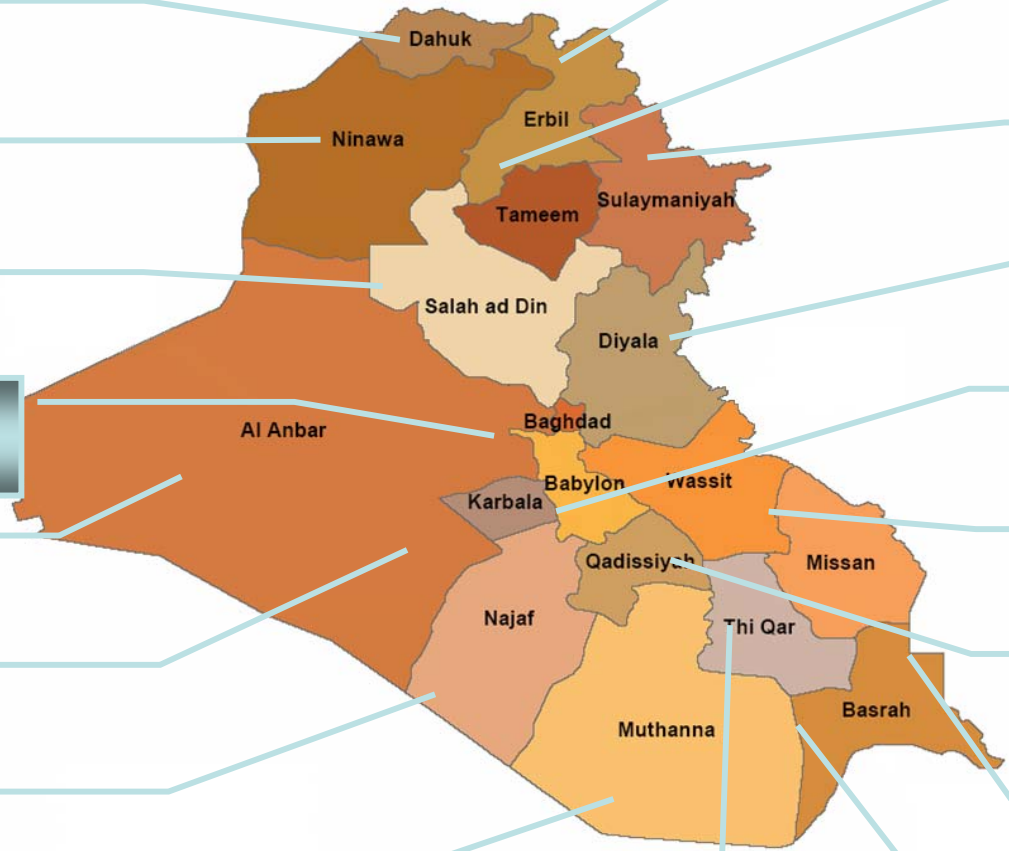


- 5 Projects $65.530
- 10 Projects $126.998
- 6 Projects $70.458
- 6 Projects $109.634
- 2 Projects $77.634
- 2 Projects $29.274
- 4 Projects $37.741
- 2 Projects $12.915
- 17 Projects $371.522
- 2 Projects $14.292
- 3 Projects $71.463
- 14 Projects $375.468

Countrywide
4 Projects
$91.840

Distribution

Total Sub-sector Program
$ 957M



ED-007
9 Projects
$25M

ED-009
22 Projects
$49M

ED-010
24 Projects
$31M

ED-001/001-1/027/028
56 Projects
$207M

ED-015
18 Projects
$15M

ED-019
10 Projects
$26M

ED-022
9 Projects
$35M

ED-026
11 Projects
$21M

ED-008
17 Projects
$38M

ED-013
16 Projects
$30M

ED-011
20 Projects
$29M

ED-005
16 Projects
$31M

ED-016
12 Projects
$43M

ED-006
15 Projects
$33M

ED-029
14 Projects
$37M

ED-026
11 Projects
$29M

ED-024
11 Projects
$51M

ED-017
8 Projects
$44M