THE REPUBLIC OF IRAQ
MINISTRY OF ELECTRICITY

SPECIAL ASSISTANCE FOR PROJECT IMPLEMENTATION (SAPI)
FOR
ELECTRICITY SECTOR RECONSTRUCTION PROJECT
IN
THE REPUBLIC OF IRAQ

FINAL REPORT
(SUMMARY)

DECEMBER 2017

Japan International Cooperation Agency

NIPPON KOEI CO., LTD.

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Abbreviations

AIS	:	Air Insulated Switchgear
CB	:	Circuit Breaker
EN	:	Exchange of Notes
GEF	:	Global Environment Facility
GIS	:	Gas Insulated Switchgear
IBRD	:	International Bank for Reconstruction and Development
IDA	:	International Development Association
IPP	:	Independent Power Producer
ISIL	:	Islamic State in Iraq and the Levant
JICA	:	Japan International Cooperation Agency
JPY	:	Japanese Yen
IQD	:	Iraqi Dinar
KfW	:	Kreditanstalt für Wiederaufbau
L/C	:	Letter of Credit
MOE	:	Ministry of Electricity
MOF	:	Ministry of Finance
MOP	:	Ministry of Planning
MS	:	Mobile Substation
ODA	:	Official Development Assistance
PMT	:	Project Management Team
PQ	:	Pre-qualification
PSS/E	:	Power System Simulator for Engineering
PV	:	Photo-Voltaic
SAPI	:	Special Assistance for Project Implementation
SCS	:	Substation Control System
SS	:	Substation
TEPSCO	:	Tokyo Electric Power Services Co., Ltd.
TL	:	Transmission Line
TOAC	:	Taking Over Acceptance Certificate
UNDP	:	United Nations Development Programme
USAID	:	United States Agency for International Development
USD	:	United States Dollar
WB	:	World Bank

Exchange Rate (as of December 2017)

1 US dollar = 112.91 Japanese Yen

1 US dollar = 1,196.43 Iraqi Dinar

1 Iraqi Dinar = 0.0963 Japanese Yen

SUMMARY

1. Background and Objective

Since the electric power facilities in the Republic of Iraq (Iraq) such as power plants, transmission lines, substations, and distribution lines were devastated and deteriorated because of repeated conflicts and economic sanctions, their functions have been significantly decreased. Although reconstruction of the facilities has been gradually progressed since the end of the Iraq War, power supply capacity against the demand is still about 67-75% and long power outages are frequent. Since the electric power demand is projected to be increased along with the instauration progress and population increase, restoration and improvement of the electricity sector has become one of the most vital issues for the Iraqi reconstruction.

The Japan International Cooperation Agency (JICA) has been assisting the Iraqi electricity sector through many grant-aid and loan projects. Rehabilitation and expansion works of substation facilities has commenced under the "Electricity Sector Reconstruction Project (Phase 1)" of which the loan agreement was signed between the Government of Iraq and the Government of Japan in January 2008. JICA also conducted the Preparatory Survey on Electricity Sector Reconstruction Project II (Phase 2 Study) in 2013 to formulate further assistance projects that aims to improve the power transmission and distribution networks. The loan agreement of the Phase 2 project was signed in June 2015 based on the result of the survey.

However, because the construction sites under the Phase 1 project are spread all over the country, it is difficult to say that the appropriate construction supervision by experienced electrical experts has been made. To carry forward the next phase of the project hereafter, it is necessary to strengthen the project implementation structure. In addition, the electric power facilities have been destroyed by the invasion of the Islamic State in Iraq and the Levant (ISIL). This forces to change some construction sites under the Phase 1 project and creates new reconstruction needs. Upon the site change, it is necessary to consider security situation, reconstruction needs, and current situation of the electric power facilities.

Under such circumstances, JICA decided to conduct this study on Special Assistance for Project Implementation (SAPI) on Electricity Sector Reconstruction Project. The main objectives of the study are to:

1) Collect and identify issues and lessons learned based on the actual implementation

status of construction sites under the Phase 1 project,

2) Collect and analyze information on current power supply and demand situation and the reconstruction needs in Iraq, and

3) Seek out possibilities for further cooperation of Japan for reconstruction and new development of electric power facilities in the future.

This study covers the area throughout Iraq, especially in the Middle and Southern Regions, except the Kurdistan Region.

The scope of this study is as follows:

1) Confirmation of current situation of the electric power facilities including power flow calculations;

2) Confirmation of damage situation and reconstruction needs of the facilities including the reconstruction plan prepared by the Ministry of Electricity (MOE), priority, etc.;

3) Confirmation of implementation structure of the electric power development projects including organization, staff assignment, measures for safety, etc.;

4) Collection of information on assistance to power sector by other international donors;

5) Confirmation of status of each construction site under the Phase 1 project and identification of issues and lessons learned for the next phase of the project;

6) Collection of information on possibility of cooperation for the power sector in the future; and

7) Preparation of several reports.

2. Electric Power Sector in Iraq

Prior to the Gulf War, electricity system in Iraq was in proper condition with generation capacity exceeded the demand. The total installed generating capacity was 9,295 MW with a peak demand of about 5,100 MW. Approximately 87% of the population had access to electricity[1].

During the Gulf War in 1991, the electricity system in Iraq suffered severe damage. Several generating plants and substations were damaged and the transmission lines were put out of service. After the war, although about 50% of the generation capacity was restored by the end of 2002, electric power supply remained insufficient and unreliable, and programmed load shedding and unplanned power outages were frequent.

In this chapter, current situation and development plans of electric power sector in Iraq are described.

2.1 Ministry of Electricity

The Ministry of Electricity (MOE) in Iraq is an electric power utility in Iraq and is responsible for both the policymaking and electricity supply throughout the country including electric power generation, transmission, and distribution.

Under the Minister of MOE, there are three deputy ministers, such as Deputy Minister for Generation, Deputy Minister for Distribution, and Deputy Minister for Projects, and there are Minister's Office, Internal Control Section, General Inspector Office, and Information Center. There are ten offices as headquarter functions and four Director Generals for 1) Electric Power Generation, 2) Electric Power Transmission, 3) Electric Power Distribution, and 4) Other (Projects).

2.2 Electricity Power Demand and Supply

(1) Daily Load Curves

Figure 2-1 shows the daily load curves of the whole Iraq in four months: January, March, July, and October in 2015.

[1] Source: "*United Nations/World Bank Joint Iraq Needs Assessment: Electricity,*" p. 1, October 2003.

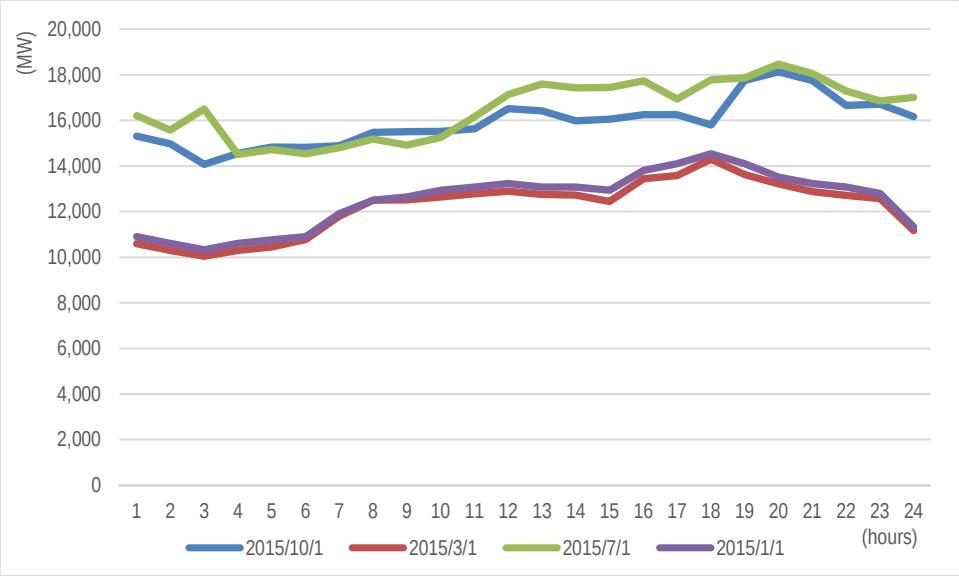


Figure 2-1 Daily Load Curves (Source: MOE)

The daily load curves show that there are two daily peaks: one in the early afternoon and the other in nighttime. The difference between night and day loads is not as large as expected for hot-climate countries where night peak is about 60-70% of day peak. It is considered that the non-residential load, especially the industrial load, is contributing to the high demand at night.

Table 2-1 shows the calculated peak demand for each governorate in Iraq in 2015.

Table 2-1 Calculated Peak Demand in 2015

Governorates	Jan (MW)	Feb (MW)	Mar (MW)	Apr (MW)	May (MW)	Jun (MW)	Jul (MW)	Aug (MW)	Sep (MW)	Oct (MW)	Nov (MW)	Dec (MW)
Baghdad	4,112	3,930	3,253	3,080	3,961	4,439	4,778	4,704	4,451	3,956	3,156	3,738
Ninewa	1,515	1,423	1,175	1,119	1,439	1,831	1,984	1,995	1,881	1,616	1,341	1,978
Kirkuk	775	703	647	597	695	771	834	838	790	679	694	944
Salahaddin	688	646	533	511	719	883	956	961	907	779	627	982
Anbar	813	764	631	582	717	915	992	997	940	808	643	983
Diyala	582	548	459	467	629	705	764	768	724	622	514	660
Babylon	666	625	522	543	702	732	794	803	757	647	545	664
Karbala	529	486	410	445	587	604	641	662	623	526	470	632
Najaf	604	567	470	467	593	623	675	680	644	552	460	639
Qadisiyah	454	425	354	365	452	450	486	490	462	397	328	408
Wasit	523	477	391	385	518	623	673	704	634	518	427	546
Muthanna	359	338	280	321	395	379	410	417	394	335	266	298
DhiQar	631	589	485	524	775	934	1,012	1,018	961	828	655	641
Maysan	462	432	359	369	513	580	623	635	613	507	395	435
Basra	1,434	1,326	1,101	1,236	2,115	2,554	2,766	2,854	2,663	2,212	1,706	1,448
Aux.+ Loss	1,485	1,403	1,106	820	1,038	1,293	1,451	1,419	1,364	1,179	875	1,132
Total	15,632	14,683	12,177	11,829	15,849	18,317	19,838	19,946	18,808	16,162	13,103	16,129

(Source: Prepared by the Study Team based on the MOE data)

The maximum total peak demand required in August was 19,946 MW in 2015. The largest demand was Baghdad, which accounted for 24% of the total peak demand. Next was Basra, which accounted for 14%. Ninewa accounted for 10%. Hence, total peak demand of Baghdad, Basra, and Ninewa accounted for about 50% of the total demand in Iraq.

As shown in the above table, peak loads are recorded in summer, July and August, because of the demand for air-conditioning facilities in the hottest season in Iraq, and bottom loads are recorded in March and April, in calm climate season.

According to the MOE's Annual Report 2014, electric power plants of MOE were able to meet only 38% of the actual electricity demand. Although some independent power producer (IPP) plants and power import from neighboring countries, Iran and Turkey tried to fill the gap; however, scheduled load shedding for the whole country was unavoidable.

(2) Power Supply in Iraq

Power supply rates calculated from required energy, supplied energy, and power supply hour rates of each governorate in 2015 are shown in Figure 2-2.

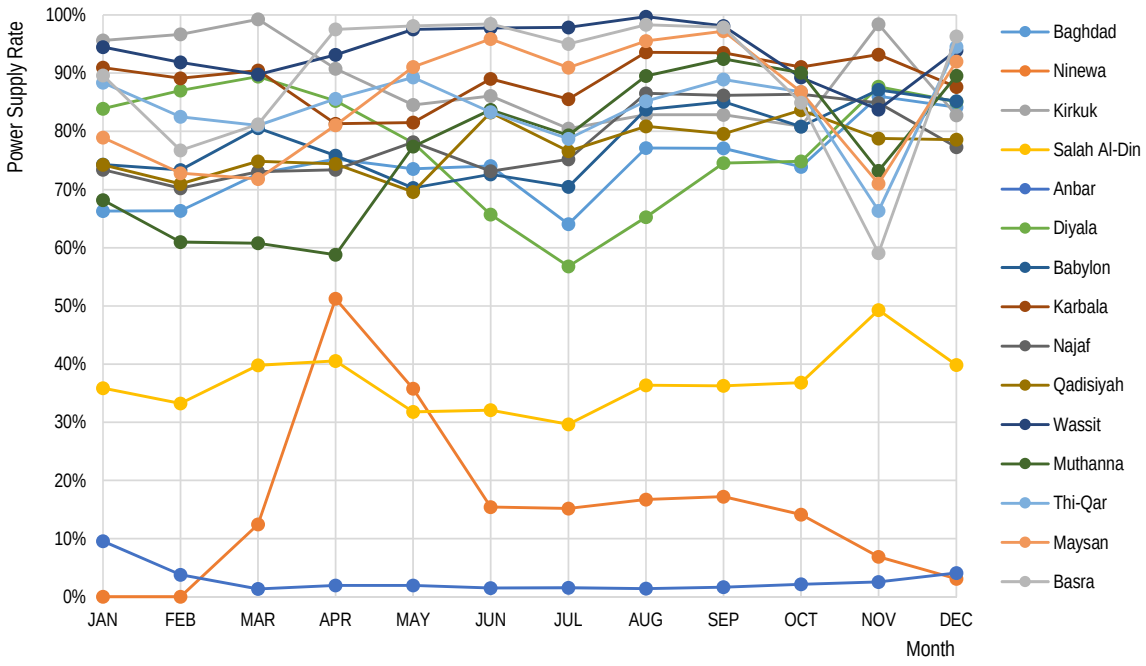


Figure 2-2 Power Supply Rates in 2015 (Source: MOE)

As shown in Figure 2-2, the power supply rates in the governorates in the northern area were less than 50%, and it is found that overall power supply situation in Iraq was insufficient.

2.3 Electric Power Facilities

(1) Power Plants

Total installed capacity of MOE's electric power generating plants as of April 2016 was 22,667 MW of which, steam thermal plants: 3,305 MW, gas thermal plants: 15,000 MW, diesel plants: 1,864 MW, and hydropower plants: 1,864 MW as shown in Table 2-2.

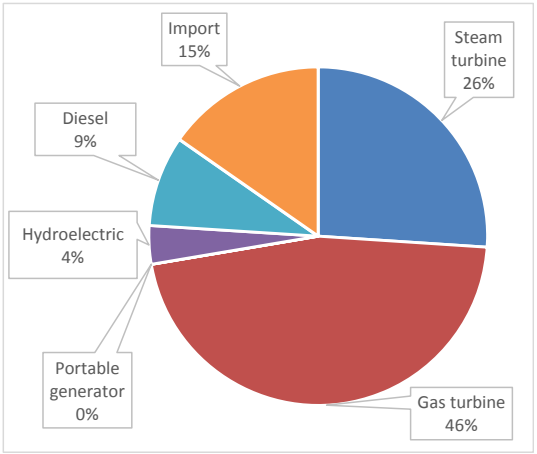
Table 2-2 Existing Power Plants in April 2016 (Source: MOE)

Power Plant Types		Nos. of Plants	Installed Capacity (MW)	Participation (%)
Thermal Power Plants	Steam Turbine	8	3,305	14.6%
	Gas Turbine	36	15,000	66.2%
	Diesel	20	2,498	11.0%
Hydro Power Plants		8	1,864	8.2%
	Total	72	22,667	100.0%

As shown in the above table, about 92% of the total generating facilities of MOE are of thermal power. The total firm capacity is about 40% (about 9,100 MW) in accordance with the MOE.

To make up for the electric power shortage, MOE imports electric power from neighboring countries such as Turkey and Iran, IPP power plants, and Kurdistan network.

The energy production situation in Iraq in 2014 is shown in Figure 2-3.



Generation Type	Energy (GWh)
Steam turbine	20,840
Gas turbine	37,046
Portable generator	0
Hydroelectric	2,935
Diesel	6,947
Import	12,251
Total	80,018

Figure 2-3 Energy Production in 2014 (Source: MOE Annual Report 2014)

The produced energy in 2014 was 80,018 GWh in total and higher energy production rates were gas turbine generation (46%) and steam turbine generation (26%).

(2) High Voltage Transmission Lines

Main transmission system voltages in Iraq are 400 kV and 132 kV of which, total

transmission line length is 5,262 km and 13,223 km, respectively as of April 2016. Transmission losses was approximately 3.5% in accordance with the MOE, and this is comparable to the neighboring countries.

(3) High Voltage Substations

There are 36 existing 400 kV substations with 93 units of 250 MVA auto-transformers, 23,250 MVA capacity in total.

There are 234 existing 132 kV substations with 593 units of several capacities of transformers, 34,509.4 MVA capacity in total.

2.4 Development Plans

(1) Peak Demand Forecast

Electric power demand forecast is essential for preparing national power system development plan. Power demand forecast in Iraq prepared by MOE is shown in Figure 2-4. The figure shows that the peak power demand in 2015 was forecasted at 20,993 MW and peak power demand is expected to increase at 54,094 MW in 2030, which is more than double that of 2015. For this reason, there will be a need for the development of the same size of power plants and power facilities.

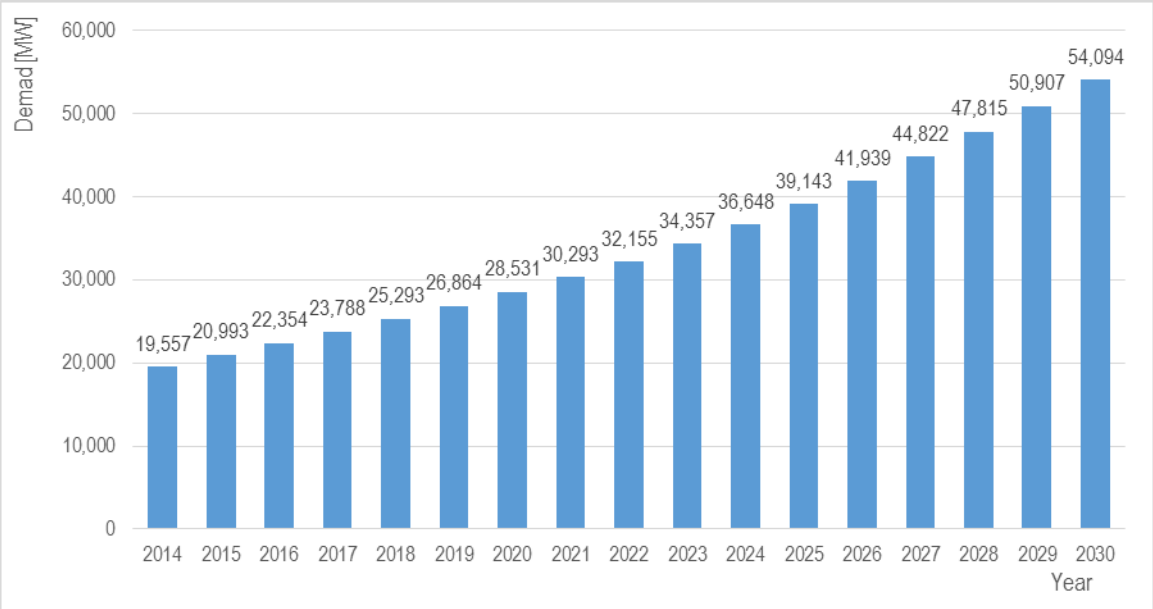


Figure 2-4 Demand Forecast 2015 – 2030 (Source: MOE)

Table 2-3 shows the peak demand forecast by governorates in 2015 and 2030. The average growth rate of peak demand in the whole country is 6.51% per year. The highest growth rates among the governorates than the average growth rate are Thi-Qar (7.03% per

year) and Kirkuk (6.91% per year).

Table 2-3 Peak Demand Forecast by Governorates

Governorates	2015	Contribution	2030	Contribution	Growth Rate
Ninawa	2,172 MW	10.3%	5,662 MW	10.5%	6.60%
Kirkuk	766 MW	3.6%	2,087 MW	3.9%	6.91%
Diyala	584 MW	2.8%	1,574 MW	2.9%	6.83%
Al-Anbar	1,431 MW	6.8%	2,742 MW	5.1%	4.43%
Baghdad	6,520 MW	31.1%	17,292 MW	32.0%	6.72%
Babil	1,103 MW	5.3%	2,632 MW	4.9%	5.97%
Kerbala	776 MW	3.7%	1,873 MW	3.5%	6.05%
Wasit	675 MW	3.2%	1,575 MW	2.9%	5.81%
Salah Al-Deen	935 MW	4.5%	2,513 MW	4.6%	6.81%
Al-Najaf	865 MW	4.1%	2,316 MW	4.3%	6.79%
Al-Qadisiya	753 MW	3.6%	1,974 MW	3.6%	6.64%
Al-Muthanna	508 MW	2.4%	1,260 MW	2.3%	6.24%
Thi-Qar	958 MW	4.6%	2,653 MW	4.9%	7.03%
Missan	672 MW	3.2%	1,802 MW	3.3%	6.80%
Basra	2,275 MW	10.8%	6,139 MW	11.3%	6.84%
Total	20,993 MW	100.0%	54,094 MW	100.0%	6.51%

(Source: MOE)

The higher peak demands by governorates in 2015 are Baghdad: 6,520 MW (31.1%), Basra: 2,275 MW (10.8%), and Ninawa: 2,172 MW (10.3%). The same situation is also expected in 2030.

(2) Planned Power System Network in 2020

The 400 kV network plays the role of the bulk power transmission system among areas and the 132 kV network plays the role of the local supply.

Figure 2-4 shows the planned 400 kV bulk power network as of 2020. The 400 kV transmission lines are particularly enhanced in the north-south direction. Mosul, Baghdad, and Basra cities are located on this transmission line.

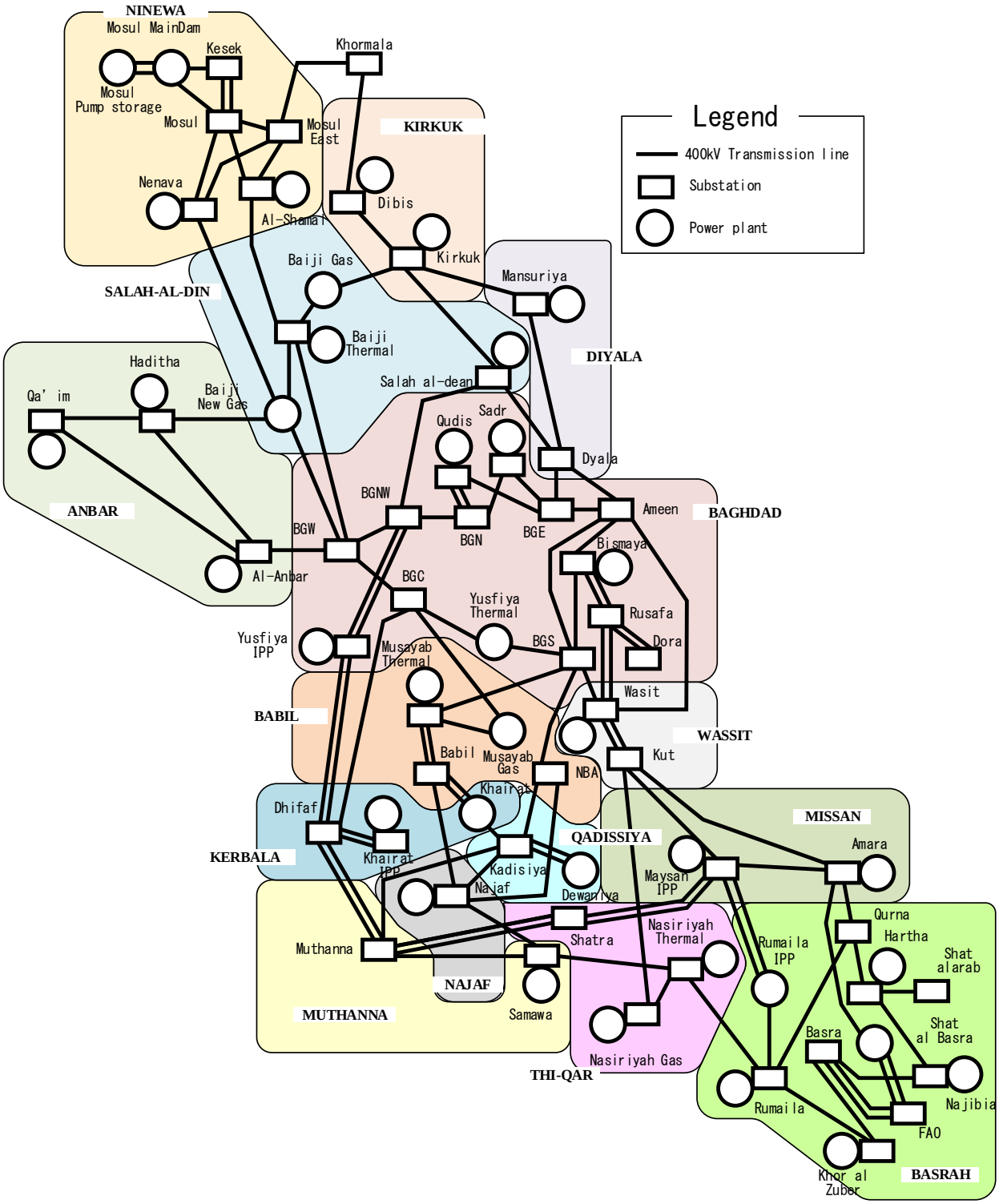


Figure 2-4 Planned 400 kV Network in 2020 (Source: MOE)

(3) Power Plants Development Plan

Total installed capacity of the planned additional generating plants up to 2020 is approximately 19,400 MW, and the total firm capacity as of 2015 is about 9,100 MW. Thus, total generating capacity expected in 2020 in Iraq is to be about 28,500 MW. It will almost be able to cover the forecast demand in 2020, which is about 28,531 MW, however, there is

no surplus margin, and if some development plans are to be delayed or some generating plants in maintenance, power shortage might happen.

2.5 Cooperation from Other Donners

(1) World Bank Group

The main assistance projects undertaken / underway by the World Bank Group on the electricity sector in Iraq in the past ten years are as follows:

1) Emergency Electricity Reconstruction Project (March 2007 – June 2015)
The objectives of this project were to: (i) alleviate the current power supply shortfall by restoring the generation capacity of the Hartha Power Station Units 2 and 3 to 400 MW (200 MW × 2 units), and (ii) lay the groundwork for improved power system planning and fuel supply by providing the tools and other support necessary to enhance in-house capability to prepare, implement, and operate current and future projects.

The project had the following two main components:

i) Rehabilitation of Hartha Power Station (USD 144 million at appraisal including contingencies; USD 183.02 million actual)
This component included the rehabilitation of units 2 and 3 of the Hartha Power Station, engineering services, support in bid evaluation, supply of equipment and installation services, construction supervision, partial implementation of environmental mitigation measures, and support to the Project Management Team (PMT) as well as to the MOE up to the end of the defects liability period.

ii) Support Services (USD 6 million at appraisal; USD 4.6 million actual)
This component intended to provide the PMT and MOE with support services for the preparation and supervision of the rehabilitation contract and other capacity-building activities, including: preparation of least-cost reconstruction and expansion plans, feasibility studies, advisory services for future projects, office equipment, independent audits, and regional and overseas training in such areas as operations, maintenance, environmental quality, financial management, and project management.

However, despite the rehabilitation work for about eight years including the interruption period, the project components i) mentioned above, due to contractual problems with contractors and project fund shortage, about 76% at the time of equipment delivery and 30% installation work were carried out. It was terminated in June 2015 and the renovation work is incomplete.

2) Integrated National Energy Strategy Technical Assistance Project (October 2010 – June 2013)

The objective of this project was to improve the ability of the government to develop an energy strategy that was designed to increase the contribution of the sector to sustainable development. The final project cost was about USD 8.5 million, but the allocation by sector was 60% for the oil and gas sector, 30% for the electricity sector, and 10% for the other energy sectors.

The project had the following two main components:

i) Development of an Integrated National Energy Strategy (USD 4.5 million at appraisal; USD 7.9 million actual): Provision of technical assistance for the development of an integrated national energy strategy for Iraq's oil, gas, and power sectors.

ii) Project Management (USD 1.75 million at appraisal; USD 0.6 million actual): Supporting the PMT in project management, monitoring, and evaluation through provision of training, consultant services, including project audit and financing of operating costs.

3) Emergency Operation for Development Project (July 2015 – June 2020 (planned))

The objective of this project is to support the Republic of Iraq in the reconstruction of damaged infrastructure attached by ISIL and the restoration of public services delivery in targeted municipal areas including Tikrit, Dour, Al Daloeya and Al-Alam in Salah Al-Din Province; and Jalula, As-Sadiya and Al-Azeem in Diyala Province.

The project consists of six components, with a total project cost of USD 350 million, each allocated budget is as follows:

i) Restoring Electricity Infrastructure and Connectivity (USD 75 million)
ii) Restoring Municipal Waste, Water, and Sanitation Services (USD 60 million)
iii) Restoring Transport Infrastructure and Developing a Housing Reconstruction Subsidy Scheme (USD 140 million)
iv) Restoring Health Services (USD 42 million)
v) Technical Assistance (USD 25 million)
vi) Project Management, Sensitization, and Monitoring and Evaluation (USD 8 million)

(2) United Nations Development Programme (UNDP)

The UNDP currently contributes USD 215,200 through the Global Environment Facility (GEF) fund and supports the following projects:

1) Catalyzing the Use of Solar Photovoltaic Energy (October 2014 – October 2018)

The purpose of this project is to suppress the use of power generation facilities in Iraq, especially private diesel generators with poor efficiency, which depends heavily on fossil fuels by introducing small and large-scale solar photovoltaic generation facilities,

and the following effects are expected:

i) Reduce dependence on fossil fuel;
ii) Result in direct GHG reductions of approximately 741,622 tones CO_2; and
iii) Provide reliable power to the Iraqi people to support development and a better standard of living.

(3) KfW Development Bank (KfW)

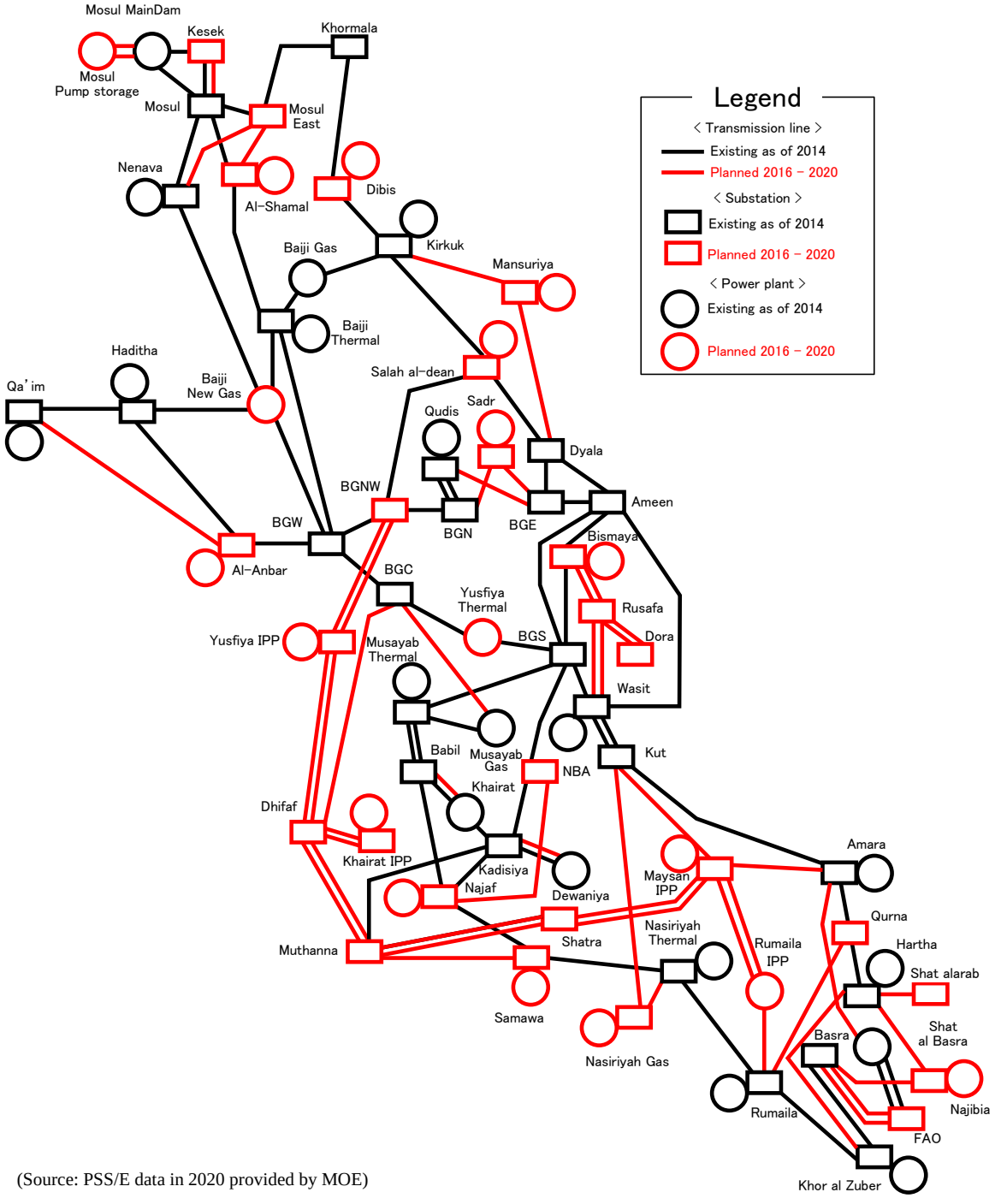
According to the press release from KfW dated on 13 February 2017, KfW and the Government of Iraq signed a framework agreement for an untied financial credit EUR 500 million in total emphasizing on restoring the foundations for basic public services in order to enable internally displaced persons to return to areas liberated from ISIL.

The funds will be used for maintaining public infrastructure, particularly in regions that could be liberated from ISIL. The measures being supported will include supplying basic services such as water, sanitation, and electricity, as well as transport infrastructure.

3. Power System Analysis

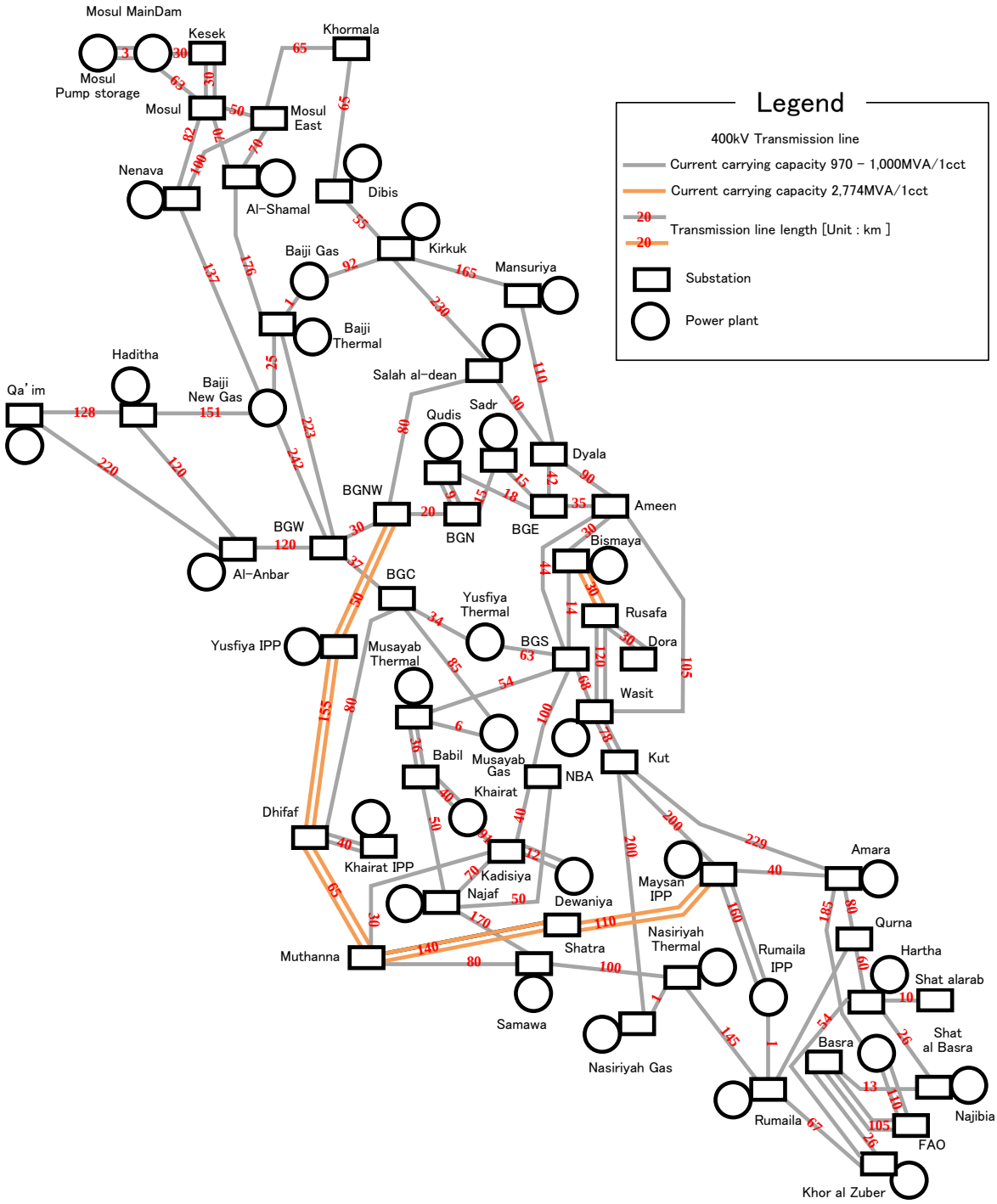
3.1 Power Network System in 2020

Figures 3-1 and 3-2 show the planned 400 kV transmission line network in 2020 based on the PSS/E data provided by the MOE. The total length of the 400 kV transmission line is approximately 9,100 km, which is about two times that of in 2015.



(Source: PSS/E data in 2020 provided by MOE)

Figure 3-1 Planned Power Network System in 2020



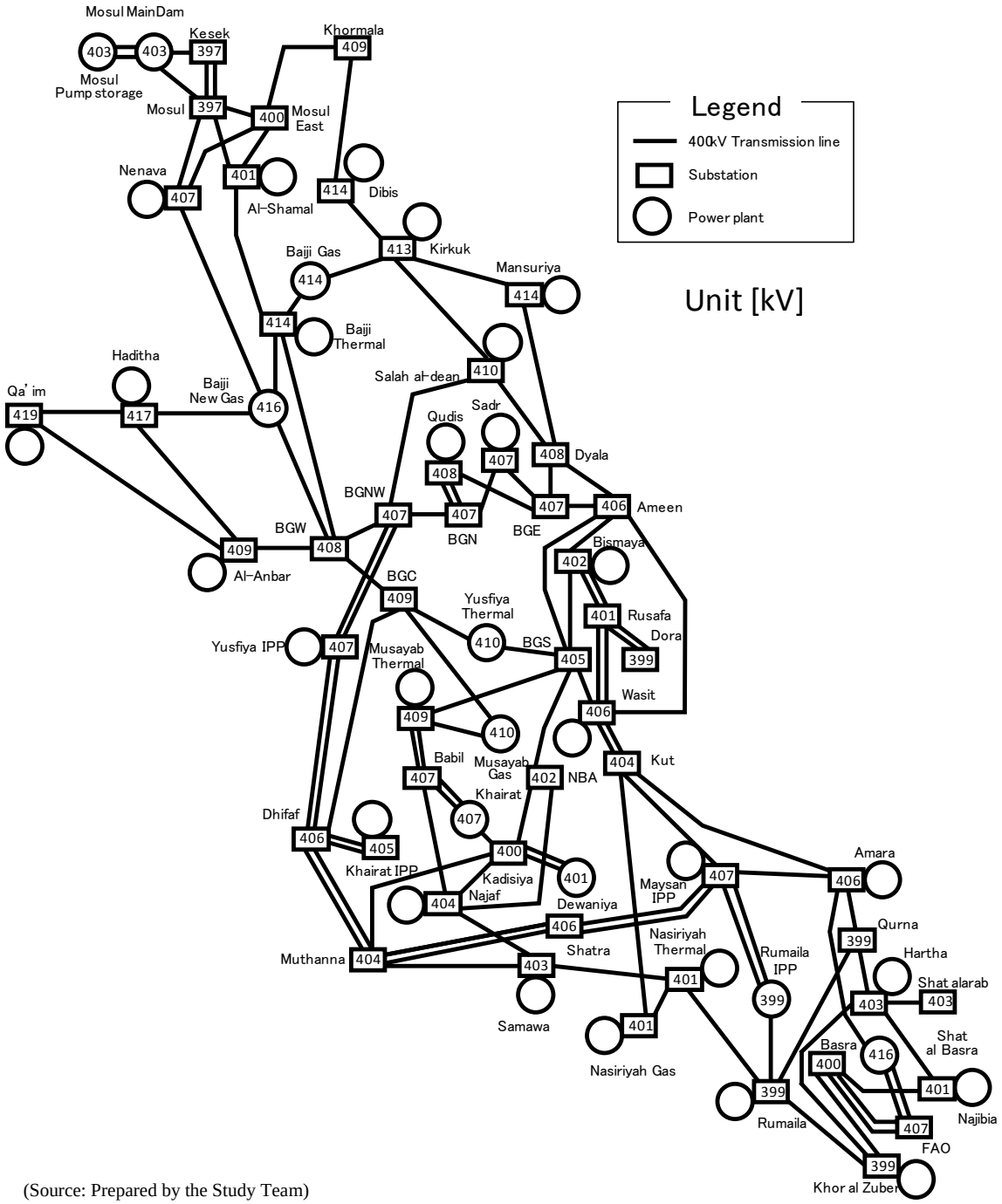
(Source: PSS/E data in 2020 provided by MOE)

Figure 3-2 Planned 400 kV Transmission Line Length and Capacity in 2020

Two types of current carrying capacities are applied for the 400 kV transmission lines (i.e. 970-1,000 MVA and 2,774 MVA per one circuit). The later transmission lines are constructed from Maysan IPP Power Station to Baghdad North West Substation to transport generated power by the power plants in the southern area to central Baghdad area.

3.2 Power System Analysis

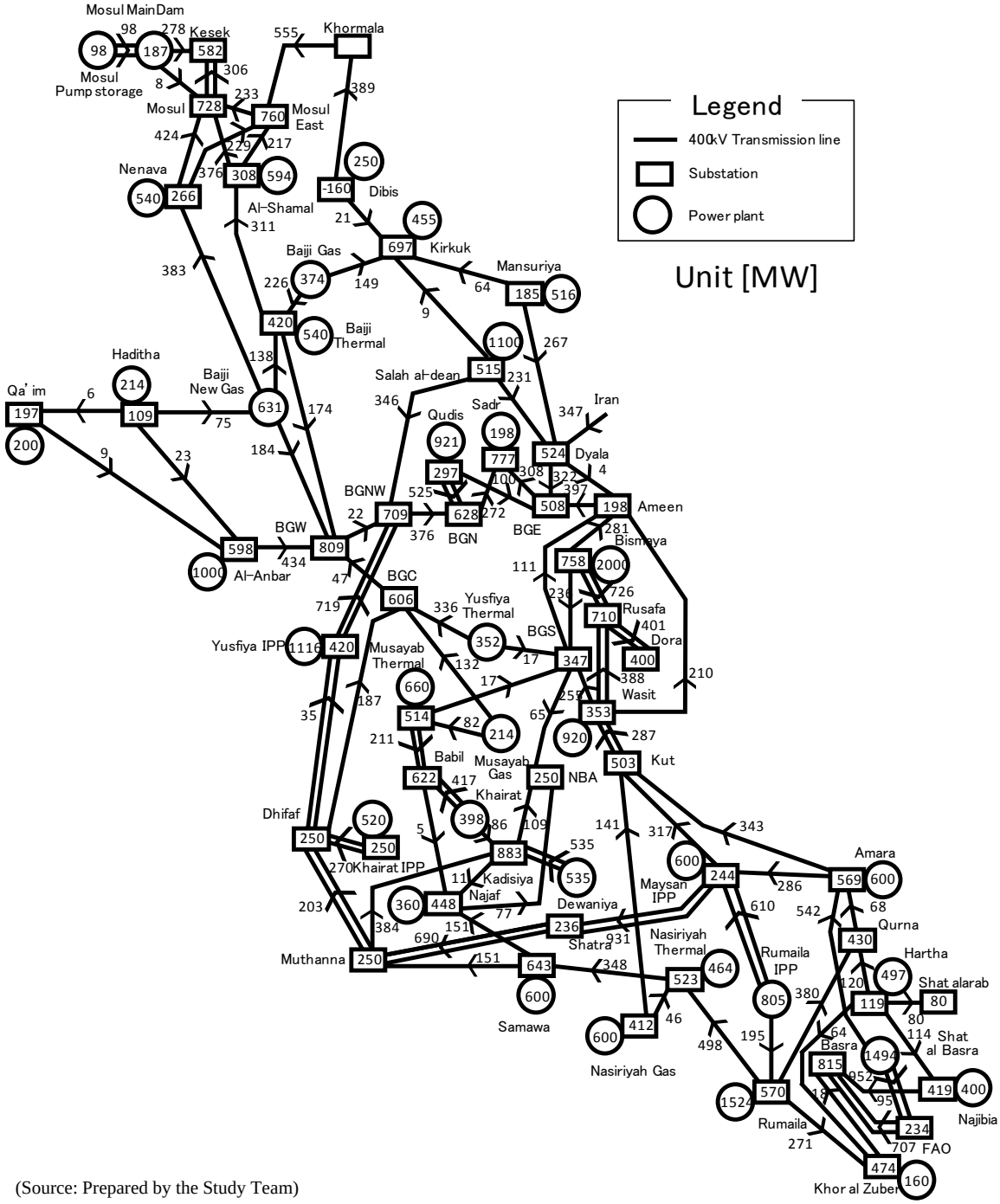
PSS/E data provided by the MOE contains the planned 400 kV and 132 kV power system in 2020. The Study Team corrected some parts of the data which apparently contained incorrect data regarding the 132 kV network. Some transformer tap values in the same substation were also modified in its proper range. Figures 3-3 and 3-4 show the results of the power flow analysis for the 2020 network, and the busbar voltage profile and power flow on the 400 kV network during the peak demand, respectively.



(Source: Prepared by the Study Team)

Figure 3-3 Substation Busbar Voltage Profile in 400 kV Network in 2020

As shown in Figure 3-3, the busbar voltage profile of the 400 kV and 132 kV systems were prescribed value by adjusting the generator terminal voltages, transformer tap values, and the amount of the static capacitors.



(Source: Prepared by the Study Team)

Figure 3-4 Power Flow on 400 kV Network in 2020

As shown in Figure 3-4, no overload is observed on all the 400 kV substations and transmission lines.

3.3 Fault Current Analysis

The fault currents on the 400 kV and 132 kV systems up to the fifth level are shown in Tables 3-1 and 3-2, respectively.

Table 3-1 Result of Fault Current Analysis for 400 kV System

No.	Station Name	Fault Current [kA]
1	Bagdad South	42
2	Bismaya	41
3	Ameen	36
4	Baghdad North West	36
5	Baghdad North	35

(Source: Prepared by the Study Team)

Table 3-2 Result of Fault Current Analysis for 132 kV System

No.	Station Name	Fault Current [kA]
1	Jamilah	52
2	New Jamilah	52
3	Sadr city	51
4	Baghdad North	50
5	Thawra	50

(Source: Prepared by the Study Team)

As shown in the tables, although all fault currents in the 400 kV substation are within the allowable range, in some of the 132 kV substations, they exceeded 40 kA. It is considered that the reason for the increment of fault currents in the 132 kV substations are as follows;

1) Development of many 400 kV transmission lines, substations, and power plants, and
2) Complex 132 kV loop network system.

3.4 N-1 Analysis

To check the reliability level of the power network system, the Study Team carried out an N-1 analysis for the 400 kV and 132 kV network in 2020. The analysis results shows;

1) The 400 kV transmission lines and the 400 kV substations satisfy the N-1 criterion.
2) The expansion plan of the 400 kV transmission lines and substations is not considered a problem.
3) The 132 kV transmission lines often do not meet the N-1 criterion.
4) Maximum overload on the 132 kV transmission line is about 245%.
5) The expansion plan of the 132 kV network needs further study.

4. Electricity Sector Reconstruction Project (IQ-P8)

The main objective of the Electricity Sector Reconstruction Project (IQ-P8, hereinafter referred to as “the Project”) is to stabilize the power supply over the country by means of construction and maintenance of substations and distribution facilities.

The fund provided by the Japanese ODA loan has been used for the supply of substation and distribution facilities and consulting services for the Project.

Executing agency of the Project is the Ministry of Electricity (MOE) in Iraq.

The Project consists of the following lots (subprojects);

Lot 1: Rehabilitation for the Existing 132 kV Mobile SS and Supply of New 132 kV Mobile SS (Subproject 1 and Subproject 2)

Lot 2: Supply of Transformer and Switchgear (Subproject 3 and Subproject 4)

Lot 3: Construction of New 132 kV SS (Subproject 5)

Lot 4: Construction of 33/11 kV Substations (Subproject 6 and Subproject 7)

Lot 5: Supply of 33/11 kV Mobile SS (Sub-project 8)

Lot 6: Construction of 400 kV GIS Substation

Figure 4-1 shows the location of the project sites.

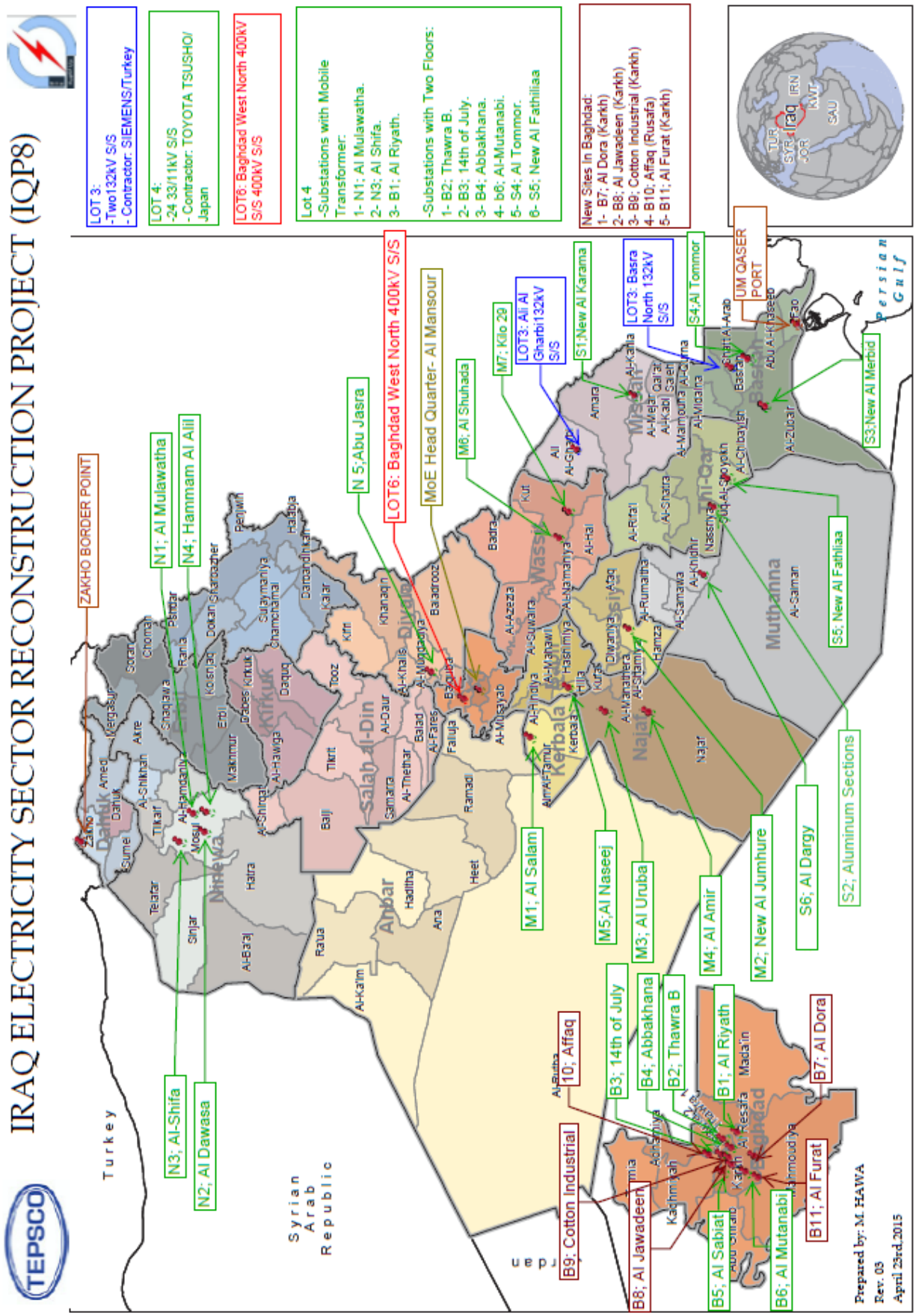


Figure 4-1 Location of the Project Sites (Source: MOE)

5. Reconstruction Needs for Power Sector

(1) Reconstruction Needs for Liberated Area and Conflict Affected Area

Tables 5-1 and 5-2 show reconstruction needs of distribution substations in the Liberated Area and Conflict Affected Area provided by the Distribution Office of MOE. Reconstruction needs in Al-Anbar, Upper Euphrates, and Diyala are shown in Table 5-1 and needs in Ninawa and Salah El-Din are shown in Table 5-2.

Al-Anbar Governorate has most reconstruction needs, 26 distribution substations. The second largest needs are in Salah El-Din governorate, 15 distribution substations. As shown in Table 5-1, most urgent needs are mobile substations, and as for the further needs, construction of distribution substations is required. Although there are no explanations about specific needs in Table 5-2 like Table 5-1, Table 5-2 shows the degree of damage percentage in distribution substation. Seven out of 20 distribution substations are 100% damaged; and 16 out of 20 distribution substations are more than 50% damaged.

Table 5-1 Reconstruction Needs for Liberated Area and Conflict Affected Area (1)

No.	Governorates	Substation Name	Installed Capacity	Urgent Needs	Further Needs
1	Al-Anbar	Al-Hadra Station	2 x 31.5 MVA	one mobile (16 MVA)	construction of 2 x 31.5 MVA
2	Al-Anbar	Al-Nasir Station	2 x 31.5 MVA	one mobile (10 MVA)	construction of 2 x 31.5 MVA
3	Al-Anbar	AL-Garma 1 Station	2 x 10 MVA	one mobile (10 MVA)	two Transformers (10 MVA)
4	Al-Anbar	AL-Garma 2 Station	2 x 10 fixed and Mobile 16 MVA	one mobile (10 MVA) and one mobile (16 MVA)	construction of 2 x 31.5 MVA
5	Al-Anbar	Al Nasaf Station	Mobile 16 MVA	one mobile (16 MVA)	------
6	Al-Anbar	Al Taawon Station	Mobile 16 MVA	one mobile (16 MVA)	------
7	Al-Anbar	Al Amiriya 1 Station	2 x 10 MVA	------	------
8	Al-Anbar	Al Amiriya 2 Station	2 x 5 MVA	------	------
9	Al-Anbar	Al Saqlawiya Station	2 x 10 MVA fixed and Mobile 16 MVA	one mobile (16 MVA)	construction of 2 x 31.5 MVA
10	Al-Anbar	Al Siyahiya Station	1 x 10 MVA + 1x 5 MVA	------	------
11	Al-Anbar	Al Tharthar Station (22 km)	fixed 1 x 5 MVA and mobile 16 MVA	one Transformer (16 MVA)	------
12	Al-Anbar	Al Shuhadaa Station	2 x 31.5 MVA	two Transformers (31.5 MVA)	------
13	Al-Anbar	Al Sharqiya Station	2 x 31.5 MVA	one mobile (10 MVA)	construction of 2 x 31.5 MVA
14	Al-Anbar	Al Qadesiya/Ramadi	2 x 31.5 MVA	one mobile (10 MVA) and one mobile (16 MVA)	construction of 2 x 31.5 MVA
15	Al-Anbar	Al Hussain/Ramadi	2 x 31.5 MVA	one mobile (16 MVA)	construction of 2 x 31.5 MVA
16	Al-Anbar	Kubaisa	2 x 10 MVA	one Transformer (10 MVA)	
17	Al-Anbar	Al Mohamadi	2 x 10 MVA	one mobile (10 MVA)	two Transformers (16 MVA)
18	Al-Anbar	Al Furat	2 x 16 MVA	one mobile (16 MVA)	two Transformers (31.5 MVA)
19	Al-Anbar	Al Mashtal	2 x 31.5 MVA	one mobile (16 MVA)	two Transformers (31.5 MVA)
20	Al-Anbar	7 kilo	2 x 10 MVA	one mobile (10 MVA)	two Transformers (16 MVA)
21	Al-Anbar	Al Eskan/mobile	1 x 16 MVA	one mobile (16 MVA)	------
22	Al-Anbar	South Ramadi	2 x 31.5 MVA	two Transformers (31.5 MVA)	------
23	Al-Anbar	Al Jaraishiy	2 x 31.5 MVA	two Transformers (31.5	------

No.	Governorates	Substation Name	Installed Capacity	Urgent Needs	Further Needs
				MVA)	
24	Al-Anbar	Al Khaldiya	2 x 10 MVA Fixed + 16 MVA mobile	one mobile (16 MVA)	construction of 2 x 31.5 MVA
25	Al-Anbar	Al Malahama	2 x 10 MVA	one mobile (10 MVA)	one Transformer (10 MVA) + one Transformer (16 MVA)
26	Al-Anbar	Al Habaniya Tamoz Base	2 x 5 MVA	------	------
27	Upper Euphrates	Barawana Station	Mobile (16 MVA)	one Mobile (16 MVA)	two Transformers (16 MVA)
28	Diyala	Al Odhaim Station	2 x 31.5 MVA	one mobile (16 MVA)	construction of 2 x 31.5 MVA
29	Diyala	Nawfal Station	2 x 16 MVA	one Transformer (16 MVA)	------
30	Diyala	Dalli Abbas Station	2 x 16 MVA	one mobile (16 MVA)	one Transformer (16 MVA)
31	Diyala	Jalawlaa Station	2 x 16 MVA	two mobile (10 MVA)	two Transformers (31.5 MVA)
32	Diyala		2 x 10 MVA	one mobile (10 MVA)	two Transformers (10 MVA)
33	Diyala	Al Sedor Area Station	1 x 16 MVA	one mobile (16 MVA)	construction of 2 x 31.5 MVA
34	Diyala	Qara Naba mobile Station	2 x 16 MVA + two mobile 5 MVA	------	construction of 2 x 31.5 MVA

(Source: MOE Distribution Office)

Table 5-2 Reconstruction Needs for Liberated Area and Conflict Affected Area (2)

No.	Governorates	Substation name	Installed Capacity	Damage Percentage
1	Ninawa	Rabiea	10 MVA + 16 MVA	50% + 50%
2	Ninawa	Domez Zamar	10 MVA	50%
3	Ninawa	Snoni (North)	10 MVA	50%
4	Ninawa	Wanah	10 MVA	50%
5	Ninawa	Eski Mosul	10 MVA	50%
6	Salah El-Din	Hetin Station/Tikrit District	2 x 31.5 MVA	100%
7	Salah El-Din	Al Qadesiya Station/Tikrit District	2 x 31.5 MVA	40%
8	Salah El-Din	Al Rayash Station/Tikrit District	2 x 16 MVA	100%
9	Salah El-Din	Al Adja Station/Tikrit District	2 x 31.5 MVA	100%
10	Salah El-Din	Al Shaheed Abdallah Station/Tikrit District	2 x 16 MVA	20%
11	Salah El-Din	Al Maghibdi Station/Tikrit District	2 x 16 MVA	20%
12	Salah El-Din	Albo-ajeel (mobile) Station/Tikrit District	1 x 16 MVA	100%
13	Salah El-Din	Yathrib Station/Balad	2 x 31.5 MVA	100%
14	Salah El-Din	Shatt AlArab Station/Balad	2 x 16 MVA	100%
15	Salah El-Din	Albo-nimir Station/Samara	2 x 16 MVA	50%
16	Salah El-Din	Yankja Station/Tooz District	2 x 16 MVA	50%
17	Salah El-Din	Salman Bek Station/Tooz District	2 x 16 MVA	50%
18	Salah El-Din	Al Dor New Station/Al Dor District	2 x 16 MVA	100%
19	Salah El-Din	Al Mutawakil Station/Al Dor District	2 x 16 MVA	50%
20	Salah El-Din	Jalam Al Dor (mobile) Station/Al Dor District	1 x 16 MVA	10%

(Source: MOE Distribution Office)

(2) Construction Needs for All Area

Tables 5-3 through 5-6 show planned 400 kV and 132 kV substations, 400 kV auto transformers and 132 kV mobile substations for all areas in Iraq. These tables show high priority substations and transformers to be constructed and/or procured.

These tables show the target year of completion, which is assumed in the "National Development Plan 2013-2017". However, because of the changing situation in Iraq, at this time, the degree of priority of projects is explained as "Urgent", "High", and "Middle" in descending order. Considering the priority in the tables, the priority is classified as follows:

Urgent needs: Ninawa, Salah Ad-Den, and Al-Anbar governorates
High needs: Kirkuk and Diyala governorates, and
Middle needs: Other than those above.

Tables 5-3 and 5-4 show planned 400 kV substations and 132 kV substations, respectively. Comparing these tables, 132 kV substations seem to be more required than the 400 kV substations. It is understandable that the number of 400 kV substations needs is fewer than that of 132 kV substations needs. Against the 8,250 MVA of the total capacity for 400 kV substations needs, the total capacity of 132 kV substations needs is 21,943 MW. In other words, required capacity of 132 kV substations is more than 2.5 times of 400 kV substations. In addition, as shown in Tables 5-5 and 5-6, procurement of 400 kV auto-transformers and 132 kV mobile substation are planned.

Table 5-3 Planned 400 kV Substations

No.	Governorate	Substation Name	Priority	MVA	Type	Target Year of completion	New/ Rehabilitation
1	Ninawa	Kesek	Urgent	1,000	GIS	2017	New
2	Baghdad	Yosofiyah	Middle	1,000	AIS	2016	New
3	Baghdad	Dora	Middle	2,000	GIS	2019	New
4	Salah Ad-Den	Salah Ad-Den	Urgent	750	AIS	2016	Upgrading
5	Kerbala	Dhefaf Kerbala	Middle	2,000	GIS	2017	New
6	Kirkuk	Debes	High	500	---	2015	Upgrading
7	Babil	New babil	Middle	1,000	GIS	2019	New

(source: MOE)

Table 5-4 Planned 132 kV Substations

No.	Governorates	Substation Names	Priority	MVA	Type	Target Year of completion	New/ Rehabilitation
1	Ninawa	Alnoor	Urgent	189	GIS	2013	New
2	Ninawa	Bertella	Urgent	189	GIS	2013	New
3	Ninawa	Mosel South	Urgent	189	GIS	2014	New
4	Ninawa	Mamoon	Urgent	189	GIS	2015	New
5	Ninawa	Namroud	Urgent	189	GIS	2015	New
6	Ninawa	Tal-Afer 2	Urgent	189	GIS	2015	New
7	Ninawa	Shemal dist.	Urgent	189	GIS	2015	New
8	Ninawa	Yaremja South	Urgent	189	GIS	2015	New
9	Ninawa	Resala	Urgent	189	GIS	2015	New
10	Ninawa	Arbajyyah	Urgent	189	GIS	2015	New
11	Ninawa	Farouq	Urgent	189	GIS	2016	New
12	Ninawa	Shallalat	Urgent	189	GIS	2016	New
13	Ninawa	Qayara 2	Urgent	150	GIS	2016	New
14	Ninawa	Baaj	Urgent	100	GIS	2016	New

No.	Governorates	Substation Names	Priority	MVA	Type	Target Year of completion	New/ Rehabilitation
15	Ninawa	Sherqat 2	Urgent	189	GIS	2016	New
16	Babil	Jorf Al Skher	Middle	189	GIS	2014	New
17	Babil	Hashimaha Way	Middle	189	GIS	2015	New
18	Babil	Mahaweel	Middle	270	GIS	2015	New
19	Babil	Abo Gharaq	Middle	189	GIS	2015	New
20	Babil	Keffel	Middle	189	GIS	2016	New
21	Babil	Mosayab	Middle	189	GIS	2017	New
22	Baghdad	Al Turath	Middle	189	GIS	2015	New
23	Baghdad	Al Rabeea	Middle	189	GIS	2015	New
24	Baghdad	Al-Amel	Middle	189	GIS	2015	New
25	Baghdad	Toijar	Middle	270	GIS	2015	New
26	Baghdad	Sader	Middle	189	GIS	2014	New
27	Baghdad	Zayona	Middle	189	GIS	2014	New
28	Baghdad	Khan Bany Saad	Middle	189	GIS	2014	New
29	Baghdad	Tajeyat	Middle	189	GIS	2014	New
30	Baghdad	Mahmodeyah	Middle	189	GIS	2014	New
31	Baghdad	Latifeya new	Middle	189	AIS	2014	New
32	Baghdad	Sahafyeen	Middle	270	GIS	2015	New
33	Baghdad	Adala	Middle	270	GIS	2015	New
34	Baghdad	Alboatha	Middle	189	GIS	2015	New
35	Baghdad	Gayara	Middle	270	GIS	2015	New
36	Baghdad	Salman Bak	Middle	270	GIS	2015	New
37	Baghdad	Tariq	Middle	270	GIS	2016	New
38	Baghdad	Abo Ghreeb	Middle	189	GIS	2016	New
39	Baghdad	Emari	Middle	270	GIS	2016	New
40	Baghdad	Karada East	Middle	270	GIS	2016	New
41	Baghdad	Baladeyat	Middle	270	GIS	2016	New
42	Baghdad	Boob Alsham	Middle	270	GIS	2017	New
43	Dhi Qar	Refaee new	Middle	189	GIS	2014	New
44	Dhi Qar	Nasseryah East	Middle	189	GIS	2015	New
45	Dhi Qar	Aredoo	Middle	270	GIS	2015	New
46	Dhi Qar	Zaqoora	Middle	189	GIS	2016	New
47	Dhi Qar	Battha	Middle	189	GIS	2016	New
48	Dhi Qar	Chebayeesh	Middle	126	GIS	2017	New
49	Meisan	Albetera	Middle	189	GIS	2015	New
50	Meisan	Salih Castle	Middle	189	GIS	2015	New
51	Meisan	Kahla	Middle	189	GIS	2016	New
52	Salah Ad-Den	Samara South	Urgent	189	GIS	2014	New
53	Salah Ad-Den	Balad 2	Urgent	189	GIS	2015	New
54	Salah Ad-Den	Shesheen Vally	Urgent	189	GIS	2015	New
55	Salah Ad-Den	Malweyah	Urgent	270	GIS	2016	New
56	Salah Ad-Den	Beiji South	Urgent	189	GIS	2017	New
57	Al-muthanna	Romaytha new	Middle	189	GIS	2014	New
58	Al-muthanna	Qadhaa Al Slman	Middle	126	GIS	2018	New
59	Najaf	Bahr-Al Najaf	Middle	270	GIS	2015	New
60	Najaf	Manathera	Middle	189	GIS	2016	New
61	Najaf	Matthana	Middle	189	GIS	2017	New
62	Najaf	Tire Factory	Middle	189	GIS	2018	New

No.	Governorates	Substation Names	Priority	MVA	Type	Target Year of completion	New/ Rehabilitation
63	Basra	Airport (Nkhaila)	Middle	189	GIS	2013	New
64	Basra	Fayhaa	Middle	270	GIS	2013	New
65	Basra	Almdayna	Middle	270	GIS	2014	New
66	Basra	Aldaeer	Middle	189	GIS	2014	New
67	Basra	Industerial Iinstitute	Middle	189	GIS	2015	New
68	Basra	Qebla	Middle	270	GIS	2015	New
69	Basra	Qurna North	Middle	189	GIS	2015	New
70	Basra	Al Emam Al Sadek	Middle	189	GIS	2016	New
71	Basra	Turkish hospital	Middle	189	GIS	2017	New
72	Basra	Om-qaser North	Middle	270	GIS	2017	New
73	Basra	Ghadeer	Middle	189	GIS	2017	New
74	Basra	Marbid	Middle	189	GIS	2017	New
75	Basra	Saraji	Middle	189	GIS	2018	New
76	Basra	Shatt-Al Arab	Middle	270	GIS	2019	New
77	Basra	Sport City	Middle	270	GIS	2019	New
78	Basra	Qura	Middle	189	GIS	2019	New
79	Qadissiya	Dewanea West	Middle	189	GIS	2014	New
80	Qadissiya	Shameya new	Middle	270	GIS	2015	New
81	Diyala	Baquba North	High	189	GIS	2014	New
82	Diyala	Jalawla	High	189	GIS	2014	New
83	Diyala	Baquba North East	High	189	GIS	2015	New
84	Kerbala	Kerbala new	Middle	189	GIS	2014	New
85	Kerbala	Kerbala North new	Middle	270	GIS	2015	New
86	Kerbala	Kerbala South new	Middle	270	GIS	2016	New
87	Kerbala	Sawada	Middle	189	GIS	2016	New
88	Kerbala	Najaf Way	Middle	189	GIS	2017	New
89	Kerbala	Hussaineyah	Middle	189	GIS	2018	New
90	Wasit	Al-hay	Middle	189	GIS	2014	New
91	Wasit	Kout North West	Middle	189	GIS	2015	New
92	Wasit	Zubaidieah int. sec.	Middle	189	GIS	2016	New
93	Wasit	Kout Center	Middle	189	GIS	2017	New
94	Wasit	Hakeem	Middle	189	GIS	2018	New
95	Kirkuk	Kirkuk North	High	189	GIS	2013	New
96	Kirkuk	Banja Ali	High	189	GIS	2015	New
97	Kirkuk	Al-zab	High	189	GIS	2015	New
98	Kirkuk	Doz 2	High	189	GIS	2015	New
99	Kirkuk	Daqouq	High	100	GIS	2015	New
100	Kirkuk	Debes new	High	189	GIS	2016	New
101	Al-Anbar	Ramadi west	Urgent	189	GIS	2014	New
102	Al-Anbar	Baghdadi	Urgent	189	GIS	2015	New
103	Al-Anbar	Qaeem west	Urgent	189	GIS	2015	New
104	Al-Anbar	Garma west	Urgent	189	GIS	2015	New
105	Al-Anbar	Cement fact. 1	Urgent	100	GIS	2015	New
106	Al-Anbar	Cement fact. 2	Urgent	100	GIS	2015	New
107	Al-Anbar	Saqlaweyah	Urgent	189	GIS	2016	New
108	Al-Anbar	Khalideyah south	Urgent	189	GIS	2017	New
109	Al-Anbar	Ramadi north	Urgent	189	GIS	2018	New

(Source: MOE)

Table 5-5 Planned Procurement of 400 kV Auto-Transformers

No.	Governorate	Substation Name	Priority	Target Year of Completion
1	AL-Kadisya	AL-Kadisya	Middle	2016
2	Wasit	Wasit	Middle	2016
3	Baghdad	Baghdad West	Middle	2016
4	Anbar	Al-Qaim	Urgent	2016

(Source: MOE)

Table 5-6 Planned Procurement of 132 kV Mobile Substations

No.	Governorate	Substation Name	Priority	Target Year of Completion
1	Mesan	Amara East	Middle	2016
2	Wasit	Numanya	Middle	2016
3	Baghdad	Al-Mansure	Middle	2016
4	Babylon	Jurf Al-Sakher	Middle	2016
5	Babylon	Hilla South	Middle	2016
6	Babylon	Latifia	Middle	2016
7	Anbar	Fallujah North	Urgent	2016
8	Anbar	Fallujah South	Urgent	2016
9	Anbar	Old Anbar	Urgent	2016
10	Anbar	South Anbar	Urgent	2016

(Source: MOE)

6. Conclusions and Recommendations

6.1 Lessons Learned from IQ-P8

Based on the lessons learned from IQ-P8, lessons and recommendations for each project implementation stage are described in this clause in order to make it a reference for future project implementation in Iraq.

(1) Design Stage (Project scope, design conditions, etc.)

1) In case that there are changes in site location, design condition and scope, then more time is required in preparation of the design, based on which tender documents were prepared. Therefore, it is important to firm up fundamental conditions of the project beforehand.

2) It is recommended to comply with the following procedure when setting the design conditions.
   i) Defining in advance exactly where the supplied equipment will be installed.
   ii) Deciding if there will be interconnection between the existing equipment and the new supplied equipment.
   iii) High light any special requirement or critical things in the existing sites.
   iv) Reviewing the design with the authorized staff of the existing site, and recording exactly their approval or comments, if any.

   Those terms seem to be what the project implementation team of MOE and the consultant has carried out and recommended to follow in the future projects.

3) It is important for the owner to confirm ownership of the land of the project site at an early stage and acquire it as necessary. It is also important to check not only the project site but also the presence or absence of regulation near the site.

(2) Tender Stage (Preparation of tender documents, evaluation, contract negotiation, etc.)

1) Preparation and changing of tender documents should be started in the very early stage of the project as it consumes time for long discussions and clarification between the owner and the Consultant, as follows:
   - Selection of locations
   - Site investigation for conditions inside and outside (adjacent obstacles on boundary line) according to changing of sites/locations
   - Changing of civil design on specified sites/locations
   - Discussion for selecting reusable equipment (switchgear, others) on the rehabilitation of existing substation

- Individual layout design is required due to limited and different dimensions of land location

To minimize the tender documents' preparation period, it is recommended that the standardized substation layout may be applied to all substation sites as much as the owner can require an adequate land for the standardized layout.

2) To reduce the needed time and effort; it is recommended to send individually the technical specification by each subject and discuss it with the interested department or engineers of the owner.

3) The contract documents should include specific requirements in case there is a need to ship back the equipment to the manufacturer's factory.

4) Around 30 days are the standard period of tender security after the validity of the tender proposal. However, because of the country's security, the owner, the consultant and the tenderers could not conduct a face-to-face communication, and are in need of more time than what was expected.

5) L/C opening process should be proceeded as early as possible. It is important that all the concerned parties should understand well in advance the procedure to smoothly open the L/C.

(3) Construction Stage (Design and manufacturing, transportation, installation, etc.)

1) The owner's site teams were trained before the commencement date by the consultant to be familiar with the documentation manual, site management manual and different site situation with the contractual action to deal with. This good practical example should also be practiced in the future projects.

2) The contractor should assign an efficient site manager with a good team of engineers, technicians and workers to have the work done smoothly and with quality. This should be clearly mentioned in the tender documents.

3) One of the most important points on project implementation is to secure the safety, where the contractor should assign a well-trained safety engineer to monitor the site work, and should consider the safety requirements to keep it safely executed, preventing all kinds of harmful accidents. This should be clearly mentioned in the tender documents.

4) In order to smoothly carry out civil engineering works and equipment installation work, the contractor needs to share installation plans and layout information of each equipment for civil subcontractors and manufacturers, and to implement equipment manufacturing design and civil engineering design in cooperation with each other.

5) With regard to tax exemption procedures, the owner ought to actively support the

contractor in cooperation with related government authorities in order to promote the import and receive of the equipment from customs. The contractors are also encouraged to implement tax exemption applications for imported equipment and materials through the owner at the earliest possible time, even before shipment.

6) In case the owner prefers to use a third party inspector for factory inspections and/or commissioning tests, they should be hired directly by the owner and not through the contractor.

7) Handling work of cargo at Umm Qasr Port should be carried out with more care and by experienced staff. Although it may be difficult even for the contractor to control the handling work at the port, the contractor should request/instruct the handler to be more careful and use experienced staff.

8) Contract documents should include specific requirements in case of shipping back the equipment to the manufacturer's factory. Issuing re-export permission should have a simpler and faster process.

(4) After Completion (Troubles during warranty period, etc.)

1) Although initial troubles on electrical equipment sometimes occur after completion and commissioning in general projects, periodical check and maintenance helps to find out the troubles in early stages.

2) A highly and comprehensive periodical check and maintenance should be carried out on the equipment, to assure the health conditions of the equipment, also following the manuals procedures in the general maintenance of the equipment will prevent any arising problems.

(5) Others (Force majeure)

In case a force majeure event occurs, the owner should make efforts to gather information and grasp the situation through government-related organizations, promptly share information with the contractors and the consultants, and discuss the countermeasures among the stakeholders.

6.2 Possibility of Japan's Support for Electricity Sector in Iraq

As discussed, the power supply facilities in Iraq are aging and being destroyed due to the three wars and the long-term economic sanctions after the 1980s, despite the MOE's efforts to restore its power facilities since the end of the war in 2003, Iraq has fallen into a chronic power supply shortage. Especially, in the summer when power supply/demand balance is very tight, planned blackouts are inevitable for a long time and have a great influence on people's lives and economic activities. Furthermore, in addition to the situation where

restoration and maintenance of destroyed/aged transmission lines and substation equipment cannot be made in time, due to the impact of the ISIL invasion after 2014, the power equipment were seriously damaged and the normal power supply falls into more difficult situation.

Also, as of November 2017, although recapturing Mosul by Iraqi forces is reported, the electricity demand in Baghdad and its surrounding areas is increasing due to the population increase because of the influx of internally displaced persons. Furthermore, in Anbar in the west, the return of residents to the liberated areas recaptured from ISIL has started, but damage to power facilities is enormous and sufficient electric power supply has not been made so emergency restoration measures are required.

Under such circumstances, each international donor such as the World Bank Group is implementing or expressing support for infrastructure reconstruction including the electric power facilities in the liberated areas recaptured from ISIL and support for returning internally displaced persons.

Japan has already been implementing the "Electricity Sector Reconstruction Project (E/N signed in April 2007)" and "Electricity Sector Reconstruction Project (Phase 2) (E/N signed in May 2015)", which are official development assistance (ODA) loan projects for reconstruction and improvement of substation facilities in Iraq.

In addition to these, in order to encourage the return of internally displaced persons to the liberated area as well as support for the improvement of electricity supply-demand balance and restoration of electric power facilities, implementation of Japan's emergency reconstruction assistance, "Electricity Sector Reconstruction Project (Phase 3)", has been covenanted between the Government of Japan and the Government of the Republic of Iraq (E/N signed in January 2017). The Phase 3 project has enormous significance in contributing not only to the regional stabilization but also to the cooperation with other donors. Therefore, early implementation of the Phase 3 Project is expected.