



Project Title:	Rehabilitation of the National Dispatch Centre, Iraq
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Estimated start date:	July 2003
Estimated end date:	December 2005
Project site:	Iraq (Baghdad Governorate for NDC and other governorates for RTU's)

<u>Summary of Inputs</u>	
PROJECT TOTAL	US\$ 17,502,976
Cost sharing:	N/A
Funded:	US\$ 5,554,998
Funds required	US\$ 11,947,978

<u>Classification Information</u>	
Sector:	Electricity
Primary beneficiaries:	target The population of Iraq – 25.5 million
Secondary beneficiaries:	target National Dispatch Centre, Power Plants & Substations staff. Ministry of Electricity
Exact Location	Al- Ameen District in Baghdad for National Dispatch Centre (NDC) Power Stations and key Substations in 10 Governorates for Remote Terminal Units (RTUs)

Brief Description:

To respond to the immediate humanitarian needs of the war-affected Iraqi people through ensuring reliable and safe electricity supply to essential basic services such as water supply, hospitals, sewage treatment plants and other community services.

The rehabilitation of the National Dispatch Centre (NDC) and installation of the associated Remote Terminal Units (RTU) for remote control facilities in 19 major power generation plants 22 x 400kV substations and 2 x 132kV Tie-line substations will improve the ability of the Central Operations Control Facility of the Ministry of Electricity (MoE), responsible for the NDC, to manage the electrical network of Iraq and to operate under safe and reliable conditions.



A. CONTEXT

Within the integrated UN response to the Iraq crisis, UNDP has assumed a key role in the delivery of humanitarian assistance. Within the electricity sector, UNDP will be undertaking the following activities in consultation and collaboration with national authorities including the MoE :

- Conduct programs of emergency repairs, replacement and additions to Iraq's infrastructure including systems for the supply of power to satisfy basic humanitarian and developmental needs in Iraq. This will follow the deployment of rapid assessment teams to determine the specific needs.
- Assist in the development of a Master Plan for the electrical sector to guide the rehabilitation, strengthening and growth of the network to satisfy electricity demand at present and in the future.
- Coordinate outside financial support and lend technical expertise to the training, capacity building and institutional strengthening of the human resources and institutions in the sector.
- Support job-creation in the nation through reconstruction programmes combining emergency repair with income generation for local workers, including the vulnerable and unemployed people.

This project document constitutes a proposal for a short-term response by the UNDP to the humanitarian emergency requirements of the electricity sector in Iraq.

The project includes:

1. The rehabilitation of the National Dispatch Centre (NDC) in Al-Ameen, Baghdad, including the installation of new Supervisory Control And Data Acquisition (SCADA) and Energy Management System (EMS) **(funds already mobilized)**
2. The installation of new Remote Terminal Units (RTUs) at 19 (nineteen) major power plants, 22 (twenty two) 400kV substations and 2 (two) 132kV tie-line substations for import/export of energy with Syria and Turkey **(approval of funds required)**.

This will enable the Central Operations Control facility of the Ministry of Electricity to manage the nationwide power system stability and power flow primarily through the 400kV national super-grid, the backbone of the country's electricity network.

B. PROJECT JUSTIFICATION

B.1 Problem to be addressed – The present situation

Electricity in Iraq is supplied to consumers via the national grid, which comprises an integrated nation-wide network of power stations, transmission lines, substations and distribution sub-networks supplying power to within each Governorate. The overall management of power flow in the grid including the balancing of supply with demand is supposed to be done at a centralized facility (NDC) located in Baghdad. As a result of recent wars and the ensuing UN imposed sanctions, the continuing lack of equipment and spare parts has led to severe deterioration of the overall system. This deterioration has impacted not only generating capacity at power plants



but also network components, including transmission lines, substations and essential instrumentation required to monitor and control power flow over the network. This poses a continuing dangerous situation not only because of a constant shortfall in the power supply affecting some consumers but also because of potential overload of certain components in the national network. System overloads and power flow imbalances may lead to major failures or even system collapse affecting potentially many more consumers and essential services.

In the past, repairs were done with sub-standard materials, or by cannibalizing some units to keep others running, which in turn contributed to further failures and increased the potential of major outages. Although some maintenance and rehabilitation works have been executed since the war, and few new generation units have been, or are being installed, shortages affecting domestic consumers and the running of essential facilities are still prevalent. Even recently, power cuts of up to five hours per day are customary in some areas, while in others power supply is limited to three - five hours daily.

The NDC as an added function of the Middle Regional Control Centre was planned to be the sole controller of electricity system balance and load flow nation wide. It monitored the nationwide electricity network, but control actions had to be executed through the respective Regional Control Centers. A new building next to the existing Middle Regional Control Centre was built to house the new NDC, which will have the highest control authority over the Regional Control Centers.

The Northern, Middle and Southern Regional Control Centers were constructed in 1965 prior to the construction of the 400kV system. They have been rehabilitated and expanded in 1980 to include the new 400kV system. Unfortunately, during and following the recent war, the NDC was subject to waves of looting, vandalism and burning. Consequently, severe damage was sustained by the main NDC building, the communications department, the warehouses, the services and transport departments as well as the associated residential compound.

The Remote Terminal Units (RTUs), originally installed in 1965 and 1980 over approximately 70% of the power facilities in the country, were designed to respond through remote monitoring and controlling protocols emanating from the Regional and National Dispatch Centers. However, they are now obsolete and provide such limited capacity of response that makes their use ineffective. Compounding this problem, suitable spare parts are no longer available in the international market to rehabilitate and upgrade the existing RTU's to permit their efficient and reliable interaction with the new SCADA/EMS system that will be installed. The replacement of the RTU's by modern and reliable units, in addition to the already ongoing process of installing a modern SCADA/EMS system, is essential for the full integration and compatibility of all the components of the power control and monitoring system for Iraq's grid.

B.2 Justification

The absence of a reliable and fully functional NDC has adversely affected the management of the power network, the stability of the electricity supply in regard to voltage and current flow in the system, the planning of maintenance outages, the security and reliability of power supply to consumers, and the personal safety of the staff working in the electricity network.



The manner in which the NDC is currently functioning raises concern that the interconnected electrical system might collapse at any time. Rehabilitation and upgrading of the NDC through the installation of a new SCADA system and associated RTUs in 19 power plants and 24 substations as well as the upgrading of the power network communication system along with the rehabilitation of major power plants will permit the Dispatch Centre to effectively control the combined power generated by those 19 major power stations in Iraq. This will help system operators to balance power supply with demand in the day-to-day operations of the system at present. In the long term, it will ensure more equitable power transmission and distribution nation wide, including supply to vital humanitarian services across Iraq.

The requirement for new RTUs has already been identified during the assessment period last year. However, due to limited availability of funds it was excluded from the initial NDC project scope. Through the ongoing discussions with MoE UNDP are requested to extend the NDC project with the funding from the Government of Japan to include the installation of the RTUs, while the upgrading of the power network communication system including the installation of OPGW (Optical Ground Wire) for fiber optic communication between NDC and the RTUs as well as the rehabilitation of major power plants are going to be funded from other sources.

Principal justification of the overall effort is that at the end of the project, UNDP will have contributed to stabilizing the electricity situation throughout Iraq, to ensure the safe operation of the electricity network and to reduce casualties among staff working on the network. Moreover, the eventual impact of equitable power distribution and sustainability of supply will be of major importance to vital humanitarian sectors such as health facilities, water pumping, water treatment, waste disposal plants, etc.

Specific results will include:

- Improved power management over the network through better coordination of generation at the power stations and more effective transmission line administration. Controlling the flow of energy helps maintain a stable frequency and voltage on the national grid and avoids overloading of power stations and/or transmission lines.
- Improved safety of network operations through greater certainty of conditions at network components, thus posing lesser risk to the staff working on the system.
- Enhanced skills of network staff by capacity building, providing greater acquaintance with up to date technology and practice with the management of the new system. This will be achieved through training courses on the new control equipment and software packages.
- Enhanced working conditions at the centre, including living conditions for some of the senior staff in the residences within the compound (15 households). This is necessary to ensure that the NDC, which is located in a remote area, is effectively manned 24 hours a day, 7 days a week.



B.3 Target beneficiaries

The primary beneficiaries of the upgraded NDC will be the population of the whole country. Secondary beneficiaries will be the staff of the Ministry of Electricity operating the NDC, as well as staff at power plants and substations connected to the NDC

C. DEVELOPMENT OBJECTIVE

To respond to the immediate humanitarian needs of war-affected Iraq through ensuring reliable and safe electricity supply to all consumer categories. In particular, electricity supply to essential services such as water supply, hospitals, sewage treatment plants and other community services affecting the wellbeing, livelihood and economic development of the people.

It is understood that this project will need to be somewhat flexible and responsive to the changing dynamics in the country, which are currently unfolding.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

Immediate objective 1 (funded)

Fully rehabilitated, modernly equipped and furnished NDC building, where the SCADA/EMS, Communication and other systems would be installed and operated.

Output 1: Rehabilitated, fully equipped and furnished NDC buildings in Al-Ameen district in Baghdad.

Activity 1.1 Assess the basic requirements for the operation of the NDC and the systems operation and maintenance staff.

Activity 1.2 Rehabilitate the building.

Activity 1.3 Procure the necessary furniture, computers and other essential equipment.

Immediate objective 2 (funded)

Enhanced and reliable voice communication and electronic data transmission systems between the NDC and the respective technical and administrative departments and directorates in the Ministry of Electricity.

Output 2.1: Modern telephone exchanges and communication links and multiplexers installed.

Output 2.2: A modern communications workshop installed and equipped with the necessary tools and test equipment for repair/replacement of existing equipment and for new installations.



- Activity 2.1 Assess the basic requirements for communication equipment for telephony and data transmission as well as testing sets.
- Activity 2.2 Prepare technical specifications for the communication equipment for telephony and data transmission as well as for the testing sets.
- Activity 2.3 Procure, deliver and install the necessary communication and test equipment.

Immediate objective 3 (funded)

Enhanced capabilities of the NDC to control and monitor the operation of remotely located network facilities.

Output 3: Installed Supervisory Control and Data Acquisition (SCADA) and Energy Management System (EMS) in the National Dispatch Center in Baghdad.

- Activity 3.1 Finalize the technical specifications for the SCADA/EMS system.
- Activity 3.2 Initiate the tendering process for a turn key contract for the SCADA/EMS system.
- Activity 3.3 Evaluate the bids and award the contract.
- Activity 3.4 Manage the implementation contract and supervise the installation and commissioning of the SCADA/EMS system.

Immediate objective 4 (funding required)

Enhanced adaptability to remote control and monitoring of major power generation plants and 400 kV substations as well as 132kV tie-line substations, enabling their efficient and effective interaction with the NDC for reliable power management over the national electricity grid.

Output 4: Installed state-of-the-art RTU's with associated peripherals at 19 major power plants, all existing 400 kV and 132kV tie-line substations.

- Activity 4.1 Finalize the technical specifications of the RTUs and associated sub-systems to be included and integrated in the SCADA/EMS bid document mentioned in point 3 above.
- Activity 4.2 Expand activities 3.2 – 3.4 mentioned above to include the installation of RTUs as an integrated part of one single contract/project.



E. PROJECT STRATEGY

The project will be executed under UNDP's Direct Execution modality (DEX), whereby UNDP is accountable for the attainment of the project objectives and is responsible for its overall management. The project will be implemented in cooperation with the management of the NDC, which reports to the Ministry of Electricity.

UNDP engineers will work closely with MoE engineers and specialists to finalize the scope of the various systems, requirements, priorities and eventual contracts.

As soon as the required equipment and materials are identified, they will be procured. UNDP's dedicated Procurement Unit situated in Amman will administer the prompt delivery of internationally procured goods, since the unit has expertise in the procurement of electrical equipment and materials. The unit in Amman will undertake the procurement of the required equipment and supplies in the most effective manner suited to the task. This includes assistance to the UNDP office in Tokyo in the organization and implementation of competitive bidding. This is expected would result in:

- identification and procurement of the equipment and materials necessary to accomplish the activities at hand;
- speedy delivery to Iraq of the procured equipment and material; and
- transportation of these inputs within Iraq to reach the intended destinations for installation and use of the equipment

The implementation model to be adopted will be similar to that applied by UNDP-ENRP in Northern Iraq. Local staff resources will be used as much as possible with the aim of replicating ENRP success in capacity building and know-how transfer modalities. This will be done while ensuring the safe installation of equipment and efficient operation and maintenance of the assets. The involvement of local resources will stimulate the local economy. Ultimately, the goal is to ensure a speedy and effective response to the emergency humanitarian requirements, therefore secondary objectives will be streamlined to that effect.

The UNDP is well aware of the need to make sure that its installations will ensure that all equipment purchased conforms to the relevant IEC and other international standards and protocols. UNDP will work closely with the MoE to ensure that appropriate security measures are implemented at the NDC and the complementary sites containing RTU equipment.

F. PROJECT EXECUTION

The overall rehabilitation of the NDC will be conducted in two steps:

1. Implementation of work activities to address urgent needs including general civil works, rehabilitation of the main building, supply of computers and furniture to the building, and the installation of the communication systems and related testing sets. Completion of this step will enable the NDC operators to communicate with the power stations and substations across the country.



2. Installation and commissioning of the SCADA/EMS system (Supervisory Control and Data Acquisition and Energy Management System) for the NDC in conjunction with the installation of the complementary RTUs to be sited at 43 locations.

The above will need to be followed up with reconstruction assistance to permit installation of communications equipment across Iraq and the rehabilitation of the respective power plants. Only at this point will all the electrical facilities be able to communicate properly and efficiently with the NDC.

A procurement notice inviting potential suppliers for pre-qualification has been advertised at Nikkei Newspaper on Friday 13 February 2004. Submission date for prequalification document was set for 8 March 2004 and bid document is scheduled to be issued to the qualified suppliers on 15 March 2004.

It is very much desirable that the required funding for the installation of RTUs could be confirmed and mobilized prior to the issuance of the bid document.

G. PROJECT MANAGEMENT

The project activities will be monitored regularly by UNDP. Reporting, financial controls and auditing procedures internationally applied by UNDP will be utilized. Procurement, both international and local, will be subject to UNDP rules ensuring cost-effectiveness, transparency and competitiveness.

Competitive bidding will be organized in Japan for Japanese suppliers to the extent feasible and in accordance with UNDP Financial Regulations and Rules. In this respect, and with due consideration to treating suppliers on same terms irrespective of nationality, where Japanese suppliers are not able to meet the contractual requirements of UNDP, suppliers from other countries may be contracted.

H PROJECT RISKS

The responsiveness of the programme to the existing needs will depend on the security situation in the country and the timely availability of resources. UNDP would aim to proceed with a flexible plan of action supplemented by continuous consultations with all its partners including local communities. Project implementation is very dependant on the situation on the ground and will require:

- a conducive environment for UNDP personnel to make assessments in the field;
- a security situation that is considered suitable for the UNDP staff to implement the necessary rehabilitation activities; and



- Efficient co-ordination and cooperation between all partners and stakeholders to ensure integrated initiatives and collaborative efforts.

I INPUTS and BUDGET

The scope of activities outlined above give an indication of the implementation program that will be necessary to address the existing needs. As such, the budget is indicative. Details of the indicative budget are as follows:

Budget/ footnote reference	Item Description	Funded [US\$]	Funds required [US\$]	Total [US\$]
A	Equipment / Supplies			
A1	Rehabilitation of the NDC building	1,000,000		1,000,000
A2	Supply and installation of SCADA/EMS system	3,700,000		3,700,000
A3	Supply and installation of RTUs		9,500,000	9,500,000
A4	Transport of equipment	94,000		94,000
Sum A		4,794,000	9,500,000	14,294,000
B	Personnel			
B1	International Personnel	130,000	902,000	1,032,000
B2	National Personnel	42,800	167,200	210,000
Sum B		172,800	1,069,200	1,242,000
C	Mission costs			
C1	Mission costs		180,000	180,000
Sum C			180,000	180,000
D	Operational cost			
D1	Project mobilization costs	20,000	30,000	50,000
D2	Office running cost	18,000	182,000	200,000
Sum C		38,000	212,000	250,000
SUBTOTAL (A + B + C)				15,966,000
D	Agency Management Support			
D1	Administration (7%)	350,126	767,494	1,117,620



D2	Security compliance (2%)	100,036	219,284	319,320
Sum D		450,162	986,778	1,436,940
E	Contingency			
E1	Contingency (2%)	100,036		100,036
Sum E		100,036		100,036
F	Total Project Cost			17,502,976
F1	Funded	5,554,998		
F2	Additional Funds required		11,947,978	