United Nations
Assistance Mission
for Iraq

United Nations
Development Programme
Iraq

Overview of Iraq's Electricity

October 2008

Context of Iraq's Electricity Supply and Demand

As 2008 comes to a close, Iraq continues to suffer from chronic shortages of electricity due to limited generation capacity. Until 1990, Iraq enjoyed an excellent electricity system, where generation capacity exceeded the demand of about 6000 Megawatts and additional power generation plants under construction.

Following the summer of 2003, total electrical power generation fell from a pre-war 5,300 Megawatts to 3,500 Megawatts, as the maintenance of power plants encountered numerous difficulties, the transmission systems looted, and damage inflicted by insurgents. Peak demand in 2003 was 6,000 Megawatts, and the increased shortfall started to negatively impact industry, basic services and community life.

Despite massive investments, pre-2003 generation capacity of 5,300 Megawatts was only restored in the summer of 2008; meanwhile the current peak demand has grown to 10,000 - 11,000 Megawatts.

Household consumption has almost doubled, as electrical appliances became more readily accessible to the average family, (e.g. air conditioner prices fell from pre-2003 average of over $1,000 per unit, to $300-450 as markets opened and controls loosened). Additionally, as gas and other fuels became scarcer, families became more dependent on electricity for cooking and winter heating.

As Iraq's electricity grid became overtaxed, this caused frequent breakdowns and shutdowns of the transmission and distribution systems.

Iraq's 26 pre-2003 power plants were mostly constructed in the 1970s and 1980s. No power generation capacity was added from 1990 until late 2004. New units that have been constructed and added to the existing plants. Only one completely new generation plant is on line that UNDP is aware of, Al-Quds with 600+ Megawatts generation capacity, constructed by the USA.

As social turmoil increased, with kidnappings and assassinations conducted by various factions of insurgents, many of the skilled technicians fled the country. Those few who remained struggled with repairing aging plants, the difficulties in finding foreign companies willing to work in Iraq, and with delays in ordering spare parts that were no longer in stock anywhere.

Before 2003, most of the technologies used for power generation, distribution and transmission were Russian, Japanese, Eastern and Western European. Since 2003, the organizers of power plants and systems maintenance and repairs have been compelled to return to the original vendors for parts, which often were built as custom orders and took considerable delivery time.

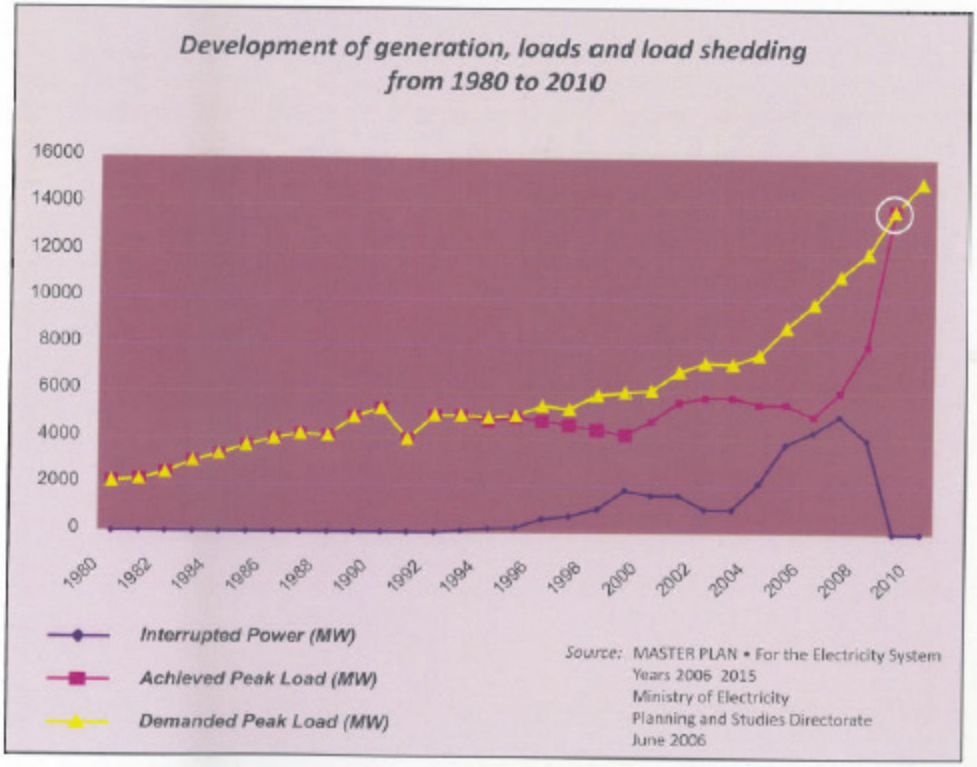
Additionally, gas and liquid fuel supplies have been affected by sabotage. Fuel shortages limit the power that can be produced from present

generation plants (e.g. large quantities of diesel must be imported from Kuwait for power generation as the Ministry of Oil does not currently refine adequate supplies). Long awaited schemes to capture flare gas from oil fields for power generation will require greater investment and time to realize. (NB a recent contract between MoO and a Western oil company promises to utilize 700 million cubic feet of flare gas in Southern Iraq by 2011.).

According to MoE, Iraqi hydropower traditionally accounted for 17% of Iraq's power generation, however, in recent years this has declined because of drought and added upstream water usage by some neighbouring countries. NB. The Mosul dam power plant was designed to produce 750 Megawatts, but currently in producing only 150 – 200 Megawatts because of falling water levels.

Fossils fuels currently used by Iraq's power plants are:

- *Gas*
- *Crude oil*
- *Heavy fuel oil (HFO)*
- *Gas oil (diesel)*



However, it is not clear whether all investments being planned by the MoE have firm contractual assurances of their future supply of one of the above fossil fuels.

On the other hand, it has taken time for the MoE and KRG MoE to rebuild the previous capacity of their departments to procure and manage equipment, systems and new facilities.

Also, foreign companies have been reluctant to engage in turn-key contracts, often preferring to initially supply equipment and parts to be shipped FOB, then later sometimes demonstrating diminished interest in bidding competitively for installation and construction works needed to complete the project.

While few, if any, significant revenues are generated by charges for electricity, Iraq's people and the MoE are very used to heavily subsidized electricity supply. Therefore, this factor in and of itself is not thought to be an urgent bottleneck to be addressed at this stage, although once electrical supplies are close to fulfilling demand, new mechanism for charging end users will be needed for sustaining a healthy MoE (and consumers will be more inclined to pay for regular service than today).

Those Iraqis who can afford the service are paying high prices for electricity to fill the gaps in grid supplies, by paying for electricity that is generated by small private diesel generators that have been set up in neighbourhoods. The poorer elements of Iraqi society cannot afford this luxury, often suffering in the extreme heat, nor can small, medium or large enterprises or industry stay competitive for long by relying on this expensive solution.

The UN role in rebuilding Iraq's electricity

Well before 2003, the funds and programmes of the United Nations were working with national institutions to improve Iraq's generation, transmission and distribution of electricity. Since 2003, the UNDG Trust Fund has funded USD 135 million dollars to UNDP for directly executed projects in electricity. Additionally, several bi-lateral donors have added USD 53 million dollars for important works by UNDP in electricity. A total of 18 completed or on-going UNDP projects in electricity have resulted from this funding.

From power plants rehabilitation projects of UNDP at Taji, Mosul, Hartha, Mussaib, approximately 370 Megawatts have been or will be added to the grid.

The UNDP project for the National Dispatch Center, funded by Japan, will be the central control system when it comes on line by 2010.

UNDP has worked closely with the MoE to help develop the first Iraq Master Plan for Electricity which was presented to the MoOil, MoFinance, MoDefense, MoEnvironment, MoWater Resources, and KRG MoE as well as the international community. The Coalition, the World Bank and Japan Bank for International Cooperation (now the Japan International Cooperation Agency, JICA), resident Embassies, at a conference at the Dead Sea in November 2006.
A revision to the 2006 Master Plan was issued jointly by the MoE in February 2008. This revision, for the time being, is for internal use although some arguments have been put forward to present the revised Master Plan during the proposed Energy Conference currently being planned for early 2009.

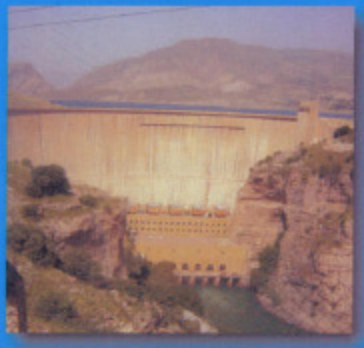
On the other hand, UNDP has assisted the MoE KRG to prepare for the procurement of electricity equipment under a 140 million USD soft loan from JICA. Once full approval is in place, expected soon, UNDP will work daily with KRG MoE to build capacity for electrical procurement to international norms, implementation supervision, and M&E.

Proposed New Support from UNDP

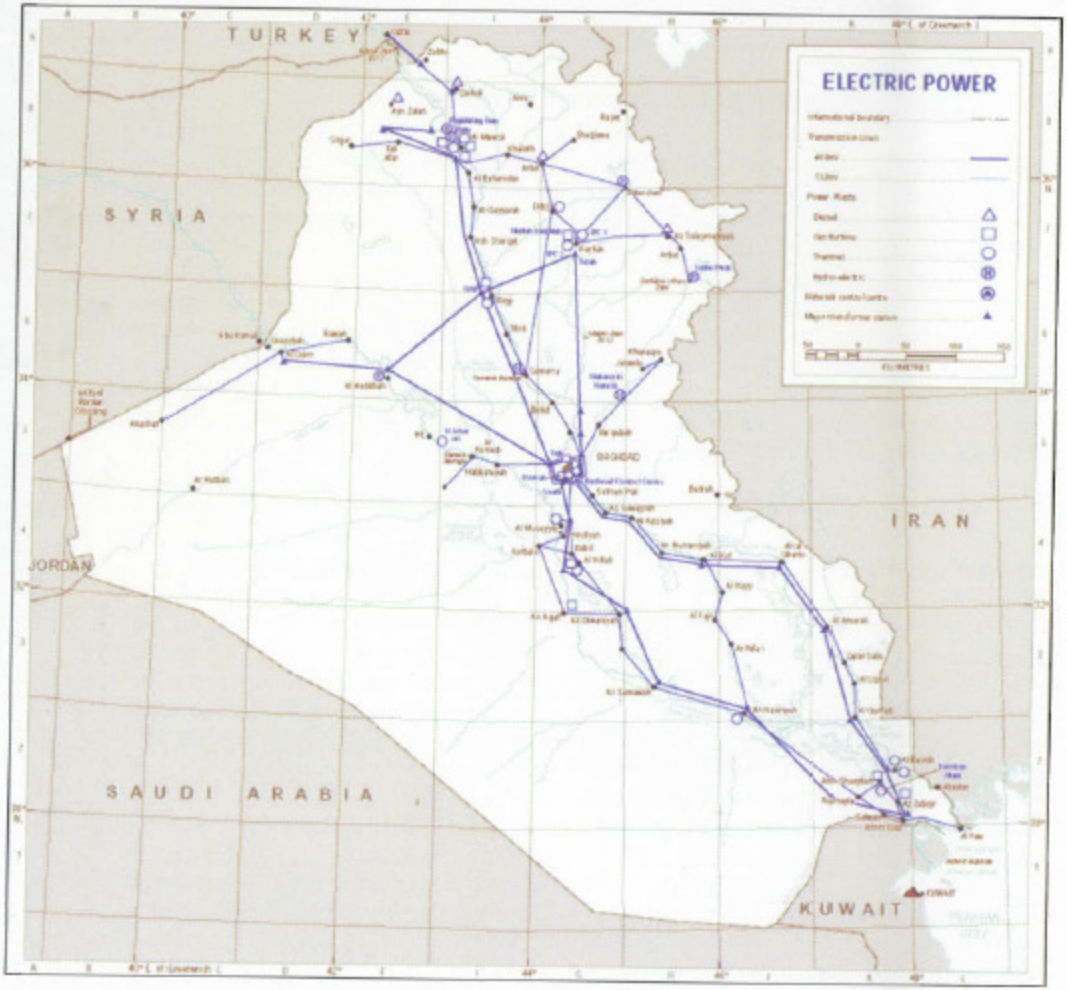
UNDP has USD 300,000 set aside for start up activities to support an Energy Master Plan for Iraq. This envisaged Master Plan would integrate all aspects of fuel and energy related to electricity, is expected to require 3 million dollars in TA expertise.

UNDP could, if requested and funding were available, expand its support in procurement and contract management and extend its support in capacity building of MoE staff to operate, maintain, install, construct and monitor and evaluate public work projects in electricity;

UNDP could support private sector involvement through Independent Power Producers (IPPs) and Public Private Partnerships (PPPs).



Iraq Power System and Power Stations



Source: MoE Presentation "Iraqi Electrical System" November 2006

This report was commissioned by UNAMI with inputs from the electrical experts of UNDP Iraq.

UNDP IRAQ ELECTRICITY PROGRAMME (2003 - PRESENT)

		Project	Source of Funds	Volume (million USD)	Date of Completion	Quantity of Equipment Delivered (ton)	Formally Trained abroad	Employed/ Trained by doing	Key Indicator (MegaWatt added)
Ongoing	1	Rehabilitation of Unit 1 at Mussaib TPS - Stage 2	UNDG-ITF (GoJ)	**33,000,000**	Jun-09	125	6	na	100MW
	2	Support to the electricity and Health Sectors in the Emergency and Long term Context	Sweden- (SIDA)	**5,370,102**	Mar-09	na	na	na	na
	3	Muthana Governorate Capacity Building and Institution Reinforcement Programme	GoJ	**4,000,000**	Mar-09	na	na	na	na
	4	Rehabilitation of the National Dispatch Center - Stage 2	UNDG-ITF (GoJ)	**11,947,978**	Dec-08	na	16	100	na
	5	Rehabilitation of Mosul Gas Power Station	UNDG-ITF (GoJ)	**17,585,450**	Nov-08	104	9	40	30 MW
	6	Rehabilitation of Taji Gas Power Station	UNDG-ITF (GoJ)	**25,891,860**	Nov-08	175	12	60	38 MW
	7	Electricity Sector Reconstruction Project in Kurdistan Region	JBIC	**791,365**	Oct-08	na	na	na	na
	8	Emergency Supply of Equipment to Electricity Sector in Iraq and Support to Essential Humanitarian Services	UNDG-ITF (DFID)	**11,999,140**	Apr-08	na	78	na	na
Completed	9	Rehabilitation of the National Dispatch Center - Stage 1	GoJ	**5,554,998**	Nov-07	na	5	na	na
	10	Al-Muthanna Governorate Electricity Network Reinforcement Programme	GoJ	**6,388,863**	Aug-07	110	7	30	na
	11	Emergency Assistance to essential Services Iraq	NORAD	**1,308,901**	Dec-06	na	na	na	na
	12	Rehabilitation of Unit 1 at Mussaib TPS - Stage 1	UNDG-ITF(GOJ)	**15,510,982**	Oct-06	300	27	203	na
	13	Rehabilitation of Hartha Power Station Stage 2	UNDG-ITF (GoJ)	**17,789,018**	Mar-06	184	6	55	100 MW
	14	Emergency Assistance for the Electricity Sector	DFID	**19,918,424**	Dec-05	na	na	na	na
	15	Technical assistance and the provision of Tools to Iraq	Belgium	**1,243,781**	Dec-05	na	na	na	na
	16	Preparatory Works – Master Plan	JBIC	**600,000**	Jun-05	na	30	na	na
	17	Rehabilitation of Hartha Power Station Stage 1	GoJ	**7,985,710**	Mar-05	60	9	5	100 MW
	18	Support for implementation of electricity projects	UNDP	**980,000**	Feb-05	na	na	na	na
		TOTALS		187,866,572		1,058	205	493	368 MW