

IJA # 41

Archival Materials of ESB Projects in the Middle East

ESB International

The Middle East



Project reference listing



ESB INTERNATIONAL

COMPILED BY



2000

ESB International
The Middle East



Project reference listing



2000

TABLE OF CONTENTS

ESB International

The Middle East

ARABIAN PENINSULA

EGYPT

ISRAEL

JORDAN

KUWAIT

LEBANON

LIBYA

OMAN

PALESTINE

QATAR

SAUDI ARABIA

SYRIA

YEMEN

UNIDENTIFIED COUNTRIES

OTHER

Project reference listing

TABLE OF CONTENTS

BAHRAIN1

DUBAI2

EGYPT2

GULF STATES.....4

IRAN.....4

JORDAN4

KUWAIT.....5

LEBANON5

LIBYA6

OMAN8

PAKISTAN8

PALESTINE.....11

QATAR.....11

SAUDI ARABIA11

SYRIA.....17

TURKEY19

UNITED ARAB EMIRATES19

YEMEN21

ESB International
The Middle East

Project reference listing



BAHRAIN

Client: *Ministry of Works, Power and Water*

Project: *Ongoing Support to the Ministry of Works, Power and Water*

ESB International has been Resident Consultant to the Ministry for the period 1976 to date. During that time, the Company has provided a wide range of engineering and consultancy services to the Ministry and has overseen the complete rehabilitation and development of the transmission system.

Among the specific projects undertaken by ESB International were:

- Planning, design, specifications, procurement and construction management of the 66kV and 220kV networks. (Ongoing)
- Planning, design, specifications, construction management and commissioning of a system and distribution control centre. (1990)
- Development of tariff structures, accounting systems and computer facilities. (1990)*
- Assessment of tenders and selection of contractors for installation of city street lighting. (1989)*
- Training in Ireland of Bahraini engineers in aspects of power generation, transmission and computer operations. (1989)*
- Design of training centres and writing of a series of training manuals. (1989)*
- Preparation of system development plans for the period 1976 - 1985 and 1985 - 1993. (1988)*
- Preparation and assessment of tender documents for maintenance contracts for the Ministry's SCADA and computer systems. (1984)*

Client: *Electricity and Water Directorate*

Project: *Management and Technical Training to a Range of Management and Technical Staff in the Utility. (1988)**

Specification, Analysis, Design and Development, and Installation of a Customer Information and Billing System.

*Study of Mobile Radio System and Formulation of Development and Enhancement Plans for a Multi-Channel, Multi-Facility Radio System (1987)**

BAHRAIN (Continued)

Client: *Aluminium Bahrain (ALBA)*

Project: *Safety Audit of Mechanical and Electrical Plant. (1992)**

*Ongoing Training in the Area of Power Plant Operation and Maintenance for ALBA Engineers. (1989)**

*Vulnerability Study on ALBA's Power Station (1985)**

DUBAI

Client: *Dubai Electricity and Water Authority*

Project: *Supply and Installation of 400kV Overhead Line and Substation Extension Works (Ongoing)**

The works comprised two main projects to expand the 400kV Transmission network in Dubai:

Project A consisted of the design and erection of approximately 400kV Overhead lines.

Project B consisted of extensions to 3 x 400kV GIS substations, upgrading of switchgear at 2 x 132kV GIS substations, installation of 2 x 450MVA 400/132kV Interconnection Transformers and the diversion of 2 x 132kV cables.

EGYPT

Client: *Egyptian Electricity Authority*

Project: *Load Research and Load Management Study (1996)**

ESBI has undertaken a detailed analysis of the development of the overall system demand profile and in depth studies of the current industry and of irrigation as practised in Egypt. A study has also been made of other industries in Egypt and other residential and commercial sectors.

EGYPT (Continued)

Client: *Egyptian Electricity Authority*

Project: *Conversion of Gas Fired Power Plants at Mahmoudia (330 MW) and Damanhour(150 MW) to Combined Cycle Operation (1995)**

Services:

- Initial feasibility and planning studies.
- Conceptual design and technical design review.
- Tender evaluation and contract preparation.
- Construction management.
- Commissioning of plant.
- Refurbishment of twelve existing steam turbines.

Client: *Egyptian Electricity Authority*

Project: *Sector-Wide Study of Manpower and Training Needs of E.E.A (1990)**

Project: *Review of Specifications for Coal-Fired Power Plant (1988)**

Client: *Rural Electrification Authority*

Project: *Design of Foundations for 220kV Transmission lines and Lines and Recommendations on Equipment Foundations (1985)**

Client: *General Electric, USA*

Project: *Provision of Engineering Staff to Supervise the Construction, Erection of Equipment and Commissioning of a 66kV Substation (1985)**

*Staff Training in the Area of Plant Operation and Maintenance (1985)**

Client: *Egyptian Electricity Authority (EEA) / World Bank*

Project: *Development and Installation of an Automated Accounting and Financial System for EEA (Ongoing)**

ESB International is currently developing an automated accounting and financial system for EEA. The project includes:

- Diagnostic Study
- System design and development
- Implementation and training

EGYPT (Continued)

The system will cover financial accounting, budgeting and costing in each of EEA's zones and headquarters. The system is being developed by ESBI to meet the specific needs of EEA e.g. Egyptian National Chart of accounts. The operating language will be Arabic.

EEA will have access to data to produce strategic management information quickly using the latest hardware and database technology.

GULF STATES

Client: *University of Petroleum and Minerals, Dhahran*

Project: *Feasibility Study on the Interconnection of the Gulf States (1989)**

The following reports were produced:

- Twenty-Year Projections on Electricity Demand.
- Preliminary Generation Planning Studies.
- Optimum Interconnection Capacity for the Nineteen States.
- Effect of Interconnection on Generating Capacity.
- Review of Most Economic Intertie Capacities.

IRAN

Client: *United Nations*

Project: *Assessment of War Damage in Energy and Telecommunication Sector (1991)**

JORDAN

Client: *Jordan Electricity Authority*

Project: *Engineering Services for Gas Scrubber Installation Risha Power Station (1992)**

Project: *Provision of Training Consultants for Two Year Period (1986)**

KUWAIT

Client: *Ministry of Electricity and Water*

Project: *Operation and Maintenance Training (1994)**

Provision of training to 15 engineers from Ministry of Electricity & Water in Operation and Maintenance of power plants.

Project: *Diagnostic Study of the Administrative Systems of the Ministry of Electricity and Water (MEW) (1993)**

Services provided by ESBI included:

- Conducting a diagnostic study of MEW's existing IT facilities and capabilities.
- Adaption of a part of an existing ESBI Customer Services System data model to suit MEW's requirements.
- Production of a mini prototype application.
- Presentation of a series of recommendations to MEW's senior management outlining appropriate IT developments.

LEBANON

Client: *Council for Development and Reconstruction of Lebanon*

Project: *Establishment and Management of an Electricity Sector Implementation Unit (SIU) responsible for Management and Implementation of Initiatives in the Electricity Sector (1996)**

The project involved:

- Coordination, scheduling, budgeting, etc. of activities ongoing in the Electricity Sector.
- Identification of priority projects.
- Preparation of terms of reference, specifications, contract documents, etc. for each project identified.
- Management of consultants and engineers involved in planning, design and implementation of specific projects.
- Evaluation of performance and activities of consultants and engineers involved in specific projects.
- Preparation of reports, documentation, etc. required for processing payment of consultants, contractors, etc.

LEBANON (Continued)

Client: *Electricite du Liban*

Project: *Design Study for Private Telecommunications Network for EDL*

Preparation of conceptual design study for a private telecommunications network for EDL incorporating microwave radio, optical fibre (both direct buried and carried on overhead power lines) as well as copper pilot cables. The study also made recommendations on the support structures required to operate and maintain the proposed telecommunications network. (1996)*

*Development of Contracts Management Information System. (1995/1996)**

*Development of Capital Asset Register. (1995/1996)**

Client: *Electricité du Liban*

Project: *Environmental Impact Assessment (1995/1996)**

The assignment involved project management and procurement procedures for environmental services for two 430 MW combined cycle power plants, 350km of 220 kV underground cables and overhead lines, and 11 new substations. The technical evaluation of bids and coordination of a range of project specialists were provided to the EU delegation and the Government of the Lebanon.

LIBYA

Client: *General Electricity Company of Libya*

Project: *Training Co-operation Agreement (Ongoing)**

The emphasis of this project will be to prepare General Electricity Company of Libya (GECOL) to face the competitive challenges of the future by building competence and capacity in all parts of the organisation. The overall programme is a combination of training interventions coupled with formal attachment programmes.

The training programmes will be strongly focused on providing opportunities for participants to study best practices within the utility sector. The effective transfer of knowledge and technology to the client's staff is the fundamental objective of the training activities proposed. The programme covers 22 separate courses covering the full range of utility functions in generation, transmission/distribution, accounting, finance, information technology, administration and materials procurement.

All training is to be carried out in Ireland covering a total of approximately 500 students.

LIBYA (Continued)

Client: *Ras Lanuf Oil Company*

Project: *Training in the Areas of Power Plant Operations and High Voltage Electrical Maintenance to Various Groups of Technical Staff (1992-1997)**

Client: *ABB Network Control*

Project: *Power System Studies and Calculation of Protection Settings for Distribution System (1993)**

Project: *Protection Study of a Generation and Transmission Systems, existing and planned, for the Sirte Oil Company (1992)**

Client: *Azzawiya Oil Refining Company*

Project: *Provision of Training to Technical Staff in the Area Power Plant Operation and Maintenance (1993)**

Client: *Brown and Root*

Project: *Electricity Systems Review (1992)**

The project consisted of a review of the operation and maintenance procedures of the Transmission System and the Distribution System associated with a Gas Turbine Power Plant in Libya.

Client: *GEC*

Project: *Review of Telecommunications Practices in GEC and Development of Recommendations for Implementation of a SCADA System (1997)*

Project: *Diagnostic Study of GEC Generation Department (1991)**

OMAN

Client: *Manah Power Company*

Project: *Ministry of Electricity Rusail Power Station - Operation and Maintenance Study and Advice and Water on 6 x 85MW Gas Turbine Generators (1988)**

Project: *Ghubrah Power and Water Station - Operation and Maintenance Study and Advice on 9 x 25MW Gas Turbine and 2 x 40MW Gas Turbine Generating Station (1988)**

PAKISTAN

Client: *Uch Power Limited*

Project: *Operation and Maintenance of Uch Power Station (586 MW) (Ongoing)**

ESBI has been awarded a 23 year operation and maintenance contract of Uch Power Station, scheduled for commercial operation in mid 1998. In addition ESBI will carry out an operational design review for the project and will design and install a computerised maintenance management system.

Client: *Rousch Power Limited*

Project: *Development, Operation and Maintenance of Rousch Combined Cycle Power Station (412 MW) (Ongoing)**

Rousch Power Ltd's 412 MW combined cycle power plant is currently under construction and is scheduled for commercial operation in mid 1998. ESBI, in addition to its role in developing and financing the project, has a long-term contract to operate and maintain the station. The Company is also to design and install a computerised maintenance management system.

Client: *WAPDA*

Project: *Development and Installation of Automated Accounting and Financial Systems for WAPDA (1996)**

Automation of the Accounting & Financial functions at WAPDA Headquarters and the development of a pilot system for implementation in the 500 accounting units throughout the country. The project involves the delivery and implementation of a number of key systems and the training of core staff in their use:

PAKISTAN (Continued)

- General Ledger
- Budgeting
- Load Accounting
- Bonds Management
- Cash Management
- Financial Management Information System
- Branch Current Account Reconciliation
- Personnel Information System
- Budget/Accounting System for Accounting Units

In addition the assignment calls for providing assistance to WAPDA in setting up a Financial Services subsidiary. This includes a feasibility analysis, economic appraisal, organisational and legal framework.

Client: *International Finance Corporation (IFC)/World Bank*

Project: *Engineering Advisor for the Privatisation of Electricity Utility (1995)**

ESBI was responsible for the preparation of a complete technical description and evaluation of the utility company's business; outlining operating conditions, impediments to efficient operation, attractions and benefits to potential investors and required capital investment requirements.

Client: *WAPDA*

Project: *Financial, Accounting and Management Training for Thirty Two Accountants Over an Eighteen Month Period (1990)**

Client: *Cockerill Mechanical Industries*

Project: *Kotri (150MW) and Faisalabad (150MW) Combined Cycle Power Stations (1995)**

ESB International was responsible for:

- Appraisal of Feasibility Studies.
- Design Reviews.
- Tender Specifications Review.
- Bid Evaluation.

PAKISTAN (Continued)

Client: WAPDA

Project: *Strengthening of WAPDA Engineering Training Academy and Provision of Craft Trainers (1993)**

Strengthening of WAPDA's Engineering Academy by means of a specialised Vocational Training Programme. Instruction and familiarisation of WAPDA staff with modern equipment, plant and procedures and deepening of their understanding of materials, tools, appliances and working methods in carefully selected technical areas.

Services Provided:

- Identification Mission to establish the need for additional training hardware and to establish the availability and adequacy of course materials in each training area.
- Assistance to WAPDA in the preparation of tenders for supplies and in the installation and start-up of equipment.
- Delivery of vocational training courses in eight selected technical disciplines, namely, cable jointing, motor winding, industrial electrical skills, advanced fitting practice, machining and turning, specialised welding, electronic and electric control circuitry and instrumentation, mechanical instrumentation technology - pressure and temperature.
- Revision, adaptation and testing of existing instructional material and the development of new syllabi, trainers' guides and audio-visual support packages.

Note: This project was undertaken as a joint venture with GTZ.

Client: General Electric

Project: *Provision of Engineering and Supervisory Staff and Technical Staff for the Commissioning and Initial Operation of Guddu 600MW Combined Cycle Power Station (1989)**

PALESTINE

Client: *Palestine Electricity Authority*

Project: *Provision of training to a number of senior managers from Palestine Electricity Authority (PEA), covering the areas of generation, transmission, distribution, planning, finance and training (1995)*

ESBI commenced a project to further strengthen the management and technical skills of PEA. During this training programme a number of their personnel will visit Ireland for training. This project is funded under Ireland's Bi-lateral Aid Programme.

QATAR

Client: *University of Qatar*

Project: *Provision of Engineering and Management Staff to the University Since 1984 (Ongoing)**

SAUDI ARABIA

Client: *Electricity Corporation Riyadh*

Project: *Training Services (1995)**

Provision of training to staff of the Commission in all aspects of electricity utility operations.

Client: *Royal Commission of Jubail and Yanbu*

Project: *Electrification of the City of Jubail (1995)**

ESB International, in association with Saudi Consulting House, provided a wide range of engineering design and consultancy services for the completion of the transmission and distribution networks for the residential and industrial areas of the Madinat, Al Jubail and Al Sinaiyah.

SAUDI ARABIA (Continued)

Client: *Electricity Corporation, Riyadh*

Project: *Al Baha 60MW Diesel Fired Power Plant, and Associated Transmission, Distribution Networks and SCADA System (1994)**

Services provided include:

- Site and line route selection.
- Assessment of tenders for station and lines.
- Design approvals.
- Test and inspection of plant.
- Site supervision.

Client: *Electricity Corporation Riyadh*

Project: *Al Kharj 2 x 220MW Gas Turbine Power Plant, and associated Transmission, Distribution Networks and SCADA Systems (1994)**

Services Provided include:

- Tender assessments.
- Contract negotiations.
- Design approval.
- Test and inspection of plant and equipment.
- Site supervision.

Client: *Electricity Corporation Riyadh*

Project: *Najran Gas Turbine Power Station (1994)**

ESB International provided on-site advice regarding completion of construction and commissioning of this 5 x 50MW gas turbine plant and associated transmission and distribution systems.

Client: *SCECO East*

Project: *Cable Location and Mapping Project (1994)**

The project involved the location and mapping of over 200 km of 69kV and 13.8kV cable circuits. This entailed the surveying and drafting of maps onto which the cable routes were to be traced.

SAUDI ARABIA (Continued)

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *SCADA System (1992)**

Study, specifications, tender evaluation and project management for SCADA and telecommunications facilities in 380 kV substations.

Client: *Tabouk Electricity Company*

Project: *SCADA and Electricity Network Expansion (1991)**

ESB International, in association with Saudi Consulting House, provided a range of consultancy and project management services for the development of SCADA systems and the expansion of the transmission and distribution systems in the Tabouk Region.

Services provided included:

- Conceptual design, budgetary costs and a work programme for the project.
- Preparation of full enquiry documents, contract documents, technical specifications and commercial schedules for the project.
- Technical and commercial evaluation of tenders.
- Supervision of erection of 2 x 25MW gas turbines and associated equipment.
- Supervision of construction of 3 x 13.8kV underground ring mains in Tabouk City.

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *Generation/Transmission Master Plan Update (1991)**

ESB International prepared an updated master plan to cover the period 1993-1997. The plan provides for an extra 1,500MW of generation capacity; two 380kV substations and associated lines and cable work.

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *Computerised Maintenance Management System (1991)**

Customisation and installation of the Maintenance Controller software package into oil-fired power station at Al Rabigh.

SAUDI ARABIA (Continued)

Client: *King Fahd University of Petroleum + Minerals*

Project: *Electrical Interconnection of Mashreq Arab Countries (1991)**

This major report was prepared for the UPM, for incorporation in Official Reports submitted to the Gulf Co-operation Council.

The study first developed 20 year load projections, leading on to extensive generation planning studies. This formed the basis for examination of the optimum means of interconnection of the Gulf Arab States, Syria, Iraq, Jordan, Lebanon, Egypt and Yemen.

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *380kV Transmission Development (1989)**

The project involved the construction of two new 380kV substations. ESB International provided the following services:

- Planning studies to determine the optimum connection to existing 380kV and 110kV networks.
- Preparation of all plant and SCADA enquiry documents.
- Tender evaluation and preparation of tender report.

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *Aziziah-Shaoiba Overhead Line (1989)**

The project involved the construction of a 380kV double circuit transmission line between Shaoiba and Azizah.

ESB International was responsible for:

- Preparation of route drawings.
- Preparation of enquiry documents for all plant, including OPGW, electric and multiplexing equipment.
- Tender evaluation and preparation of tender report.

SAUDI ARABIA (Continued)

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *Al Rabigh 4 x 250MW Oil-Fired Power Station (1989)**

ESB International conducted a full assessment of tenders and provided assistance in contract negotiation for the completion of this power station.

Client: *Saudi Consolidated Electricity Company in the Western Region*

Project: *Shaoiba Power Plant and Transmission Project (1989)**

ESB International carried out a layout study and prepared and evaluated all tender documents for the completion of the project. The project also involved the design of a 380kV substation extension and connection to existing 380kV network.

Client: *Electricity Corporation, Riyadh*

Project: *Coordination of Utility Practices in Saudi Arabia (1988)**

The project involved the establishment of standards, specifications and guidelines for the standardisation of all utility practices in the Kingdom. The guidelines covered the technical, management, organisational, administrative and financial aspects of the utility business.

Client: *SCECO East*

Project: *Technical Services Contract (1988)**

Under this general contract, ESB International carried out a range of projects including:

- Study of transmission system.
- Production of operations handbooks.
- Study of customer relations.
- Training in systems operations and utility management.
- Quality assurance and inspection services.

Client: *SCECO South*

Project: *Operation and Maintenance Training in the Area of Gas Turbine Power Plant Operation and Maintenance (1988)**

SAUDI ARABIA (Continued)

Client: SCECO Central

Project: Consultancy services for the new Central Region Control Centre (1988)*

Client: Atlantic Projects Company

Project: Substation Design (1987)*

Design and engineering services for completion of 2 x 110kV/38kV Substations in University of Makkah, Saudi Arabia.

Client: King Fahd University of Petroleum + Minerals

Project: Arab Interconnection Study (1986)*

Feasibility Study for interconnection of Arabian Gulf States electrical power systems. The following major reports were produced:

- Report on the Twenty Year Projections of Electricity Demand.
- Preliminary Generation Planning Studies.
- Optimum Interconnection Capacity for 19 Specified Interconnections.
- Effect of Interconnection on Generation Capacity Requirements.
- Multi-area Studies.
- Review of Most Economic Intertie Capacities.
- Most Economic Intertie Capacities : Sensitivity Studies.

Client: Saudi Consolidated Electricity Company in the Western Region

Project: Organisational Development of EWR (1985)*

ESB International carried out a review of the management structure of EWR and formulated new management structures, procedures, priorities, etc.

Client: Sadelmi

Project: Study for the Paralleling of a New Gas Turbine Station with an Existing Diesel Generator Station (1985)*

SAUDI ARABIA (Continued)

Client: ARAMCO

Project: 230kV Underground Cables (1984)*

Specification review, technical tender assessment, design approval, on-site advice during installation, and supervision of commissioning of 8 km of 230kV underground cables.

Client: ARAMCO

Project: Cable Failure Investigation (1984)*

Identification and rectification of major faults on a 69kV underground cable network in Dhahran.

Client: Atlantic Projects Company

Project: Diesel Power Station (1984)*

Feasibility study, engineering design and procurement of equipment for diesel fired power station and compressor station.

Client: SCECO East

Project: Communications System Study (1984)*

Study of the utility's communications usage and requirement with regard to telemetry, remote control, SCADA, telephone message switching and data transmission.

SYRIA

Client: Public Establishment for Distribution and Exploitation of Electric Energy (PEE)

Project: Technical Assistance to the Project Implementation Unit and Training Support (Ongoing)*

The objective of the Sector Implementation Unit (SIU) is to achieve a timely, effective and efficient management of the Electricity Sector Programme in Syria. The SIU is responsible for the management of the implementation of components which make up the Electricity Sector Programme. Responsibilities include:

SYRIA (Continued)

- Electricity Sector project scheduling and budgeting
- Co-ordination of Sector activities with other sectors and agencies.
- Allocation of funds within the Sector and identification of priority projects.
- Preparation of Terms of Reference for engineering and consultancy contracts related to the Sector.
- Management of Consultants and Engineers engaged to perform services in the Sector.
- Monitoring all contracts including scheduling and cost control.
- Progress monitoring and preparation of documents to process payments to consultants, engineers, suppliers and contractors.

Training Component

In addition, the Project also contains a major Training Component which will assist in the development of the Electricity Sector in Syria and will provide a Training Centre and complete Training Programme for the Sector. Responsibilities include:

- On site survey to investigate current work practices so as to determine training needs.
- Design of a fully self-sufficient training centre for the sector.
- Specification and procurement of equipment
- Provision of a team of training specialists to assist in the establishment of the training centre and to prepare and present training courses.
- Provision of training to selected training staff in training methods and managing the training function. This will include a period of attachment training of trainers with ESB personnel in Ireland.
- Training of senior management personnel from a wide range of disciplines.
- Development of a priority training programme for the sector, together with a long term training programme for all levels.

TURKEY

- Client:** *Cockerill Boilers*
- Project:** *Provision of Two Engineers for the Commissioning of Trackya Power Station (1989)**
- Client:** *World Bank*
- Project:** *Review of Bid Documents for 154kV GOIS Substations for Major Transmission Project (1988)**
- Client:** *General Electric*
- Project:** *Design Review on 600MW Combined Cycle Power Station (1987)**
- Client:** *ABB/Turkish Electricity Authority*
- Project:** *Feasibility Study for Marmara Power Station and Considerations for Link-Up to Transmission Network (1984)**

UNITED ARAB EMIRATES

- Client:** *Water and Electricity Department (WED)*
- Project:** *Supervision of Boiler Rehabilitation, Jebel Dhana - Abu Dhabi*
- Project:** *Supervision of all Power Station Maintenance at Umm Al Nar, Al Taweelah, Abu Dhabi and Bani Yas Power Stations (Ongoing)**

ESB International's function on the Project is to act in an advisory and supervisory capacity to WED and to provide specialists to supervise the implementation of tender specifications for the Specialised Maintenance and Refurbishment of Parts (SMART), Maintenance of Plant Auxiliaries (MOPA) and Maintenance of Motors and Pumps (MOMP).

Services include:

- Implementation of tender specification for SMART, MOPA and MOMP, including witnessing of Equipment Performance and Acceptance Tests and submission of reports detailing test results.
- Supervision of daily maintenance work.
- Review, approval and supervision of correct procedures for maintenance and refurbishment of the Power Stations.

UNITED ARAB EMIRATES (Continued)

- Coordination of Contractors' activities with the station Operation and Maintenance activities.
- Supervision of safety procedures in relation to personnel and equipment.
- Review and approval of all testing procedures for materials and equipment performance.
- Review of maintenance requirements and recommendations on necessary works and equipment outage schedules.
- Assessment of hazard risks and safety aspects. Recommendations on emergency procedures and periodic testing programmes.

Client: *Water and Electricity Department (WED)*

Project: *Load Management Study of Abu Dhabi (1995)**

ESB assisted the Water and Electricity Directorate in Abu Dhabi in developing a Power System Load Management Scheme. Services include:

- Feasibility Study (incorporating detailed load analysis of future load and planning requirements).
- Preparation of tender documents and prequalification of manufacturers.
- Design of Consumer Incentives and Bid Preparation/Evaluation.

Client: *Toshiba*

Project: *Provision of PLC Engineer (1992)**

Client: *General Electric*

Project: *Commissioning/Operations Services for Al-Taweelah Power Station (1990)**

Client: *WED/Lahmeyer International*

Project: *Evaluation, Design and Supervision of Power Monitoring Scheme for Power Production and Transmission - Abu Dhabi (1990)*

UNITED ARAB EMIRATES (Continued)

Client: *WED/Bechtel*

Project: *Provision of Generation Planner and Power Plant Planner for Abu Dhabi 2010 Master Plan (1990)*

YEMEN

Client: *PEC*

Project: *Provision of Transmission System experts and Metering Technicians (1993)**

Project: *Rehabilitation of Finance/Accounting Operations of PEC (1991)**

The overall aim of the project was to assist PEC in becoming financially viable through the strengthening of its revenue collection, accounting procedures etc. Specifically, the project involved:

- Installation of a Customer Billing System.
- Installation of a Financial Accounting System.
- Installation of a Computerised Payroll System.
- Attachment training for senior managers and accountants.



