

ELECTRIC POWER SYSTEM ENGINEERING CO.

الشركة المصرية لهندسة نظم القوى الكهربائية



EPS



Company Data

Chairman & CEO	: Eng. Hosni Hassan El-Kholy
Capital	: 5 Million LE
No. of Employees	: 250
Year of Establishment	: 1982
Address	: Misr Lel-Taamir Buildings - Sheraton Heliopolis, Zone 8, Street No. 9, Building No. 7
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E-mail	: eps@eps-egypt.com
Web Site	: www.eps-egypt.com
Nearby	: Cairo Airport , Radisson Hotel , Fairmont Hotel

Introduction

- **EPS** is a joint stock Egyptian Company established in October 1982 under the laws of the General Authority for Investments and Free Zones. The company is specialized in carrying out engineering and construction management services in the field of Electric Power Systems.
- Since its establishment, **EPS** has conducted services for more than **4200** engineering projects in the fields of electric power generation, transmission and distribution in Egypt and in Arab Countries.
- The services cover power systems planning, techno-economic feasibility studies, power systems analysis, preparation of tender documents and contracting support, supervision at construction sites, development and implementation of information technology applications. In addition, **EPS** carries out preparation and execution of training programs.

Introduction (con.)

- From inception to completion, we prepare tender documents, plan, execute, and control projects backed by proactive planning and first-hand knowledge of contract terms, client objectives, responsibilities, and capabilities. Project budgets are continuously monitored to secure budget and contract compliance.
- Engineers, technologists in addition to teams that are comprised of a variety of professions and disciplines are pooled to create effective project organization structures.

Mission

- **EPS** is committed to provide quality and cost effective engineering Services in the Field of electric power systems that fully meet the needs and expectations of every customer through expertise and standard of excellence. The Company is also dedicated to use information technology to develop systems driven by Customer needs.

Vision

- **EPS** vision is to be Successful, Well Reputed, and Continues to Serve a Growing Market and Can, With No Limitations, Compete Local Consultants. EPS Also Envisages Expanding The Services Into Business Architecture And Strategic Planning. Information Technology Is Linked To Business Architectural And Surveying Issues To Form An Integral Part Of The Business Delivered To Public Sector, Private Sector And Inter Professional Activities Covering National And Regional Markets.

Objectives

EPS objectives are:

- To operate the company for continuity, profile and stability and establish growth objectives through effective management policies and planning procedures.
- To provide shareholders with fair return on investment.
- Employee performance to be stimulated information systems that serve the processes and the management.
- Invest in corporate development and individual training.
- Continually provide employees with modern efficient development and production tools to be in the forefront in the fields of the firm's practice.
- Opening new markets.
- Achieve continuous customer satisfaction.
- To maintain relations with employees through active participation, adequate communication, fair compensation and benefits, good working conditions opportunities for work satisfaction, advancement and professional development.

Organization

- EPS is organized to offer a full range of consultancy and engineering services in the fields of power systems engineering. Each individual project is managed with only one goal in mind, which is to render the services required at the highest international standards.

Projects Group

- For each specific project or task, a number of specialized engineers are integrated to form a project team, managed by a long experienced team leader or project manager. Those specialists are assigned from the company's different departments to perform their respective tasks in accordance with established schedules and milestones to fulfill the project objectives.
- To provide an even wider range of engineering capability, EPS draws directly from the highly qualified and experienced personnel working with the different authorities and organizations of the Electricity and Energy sector.

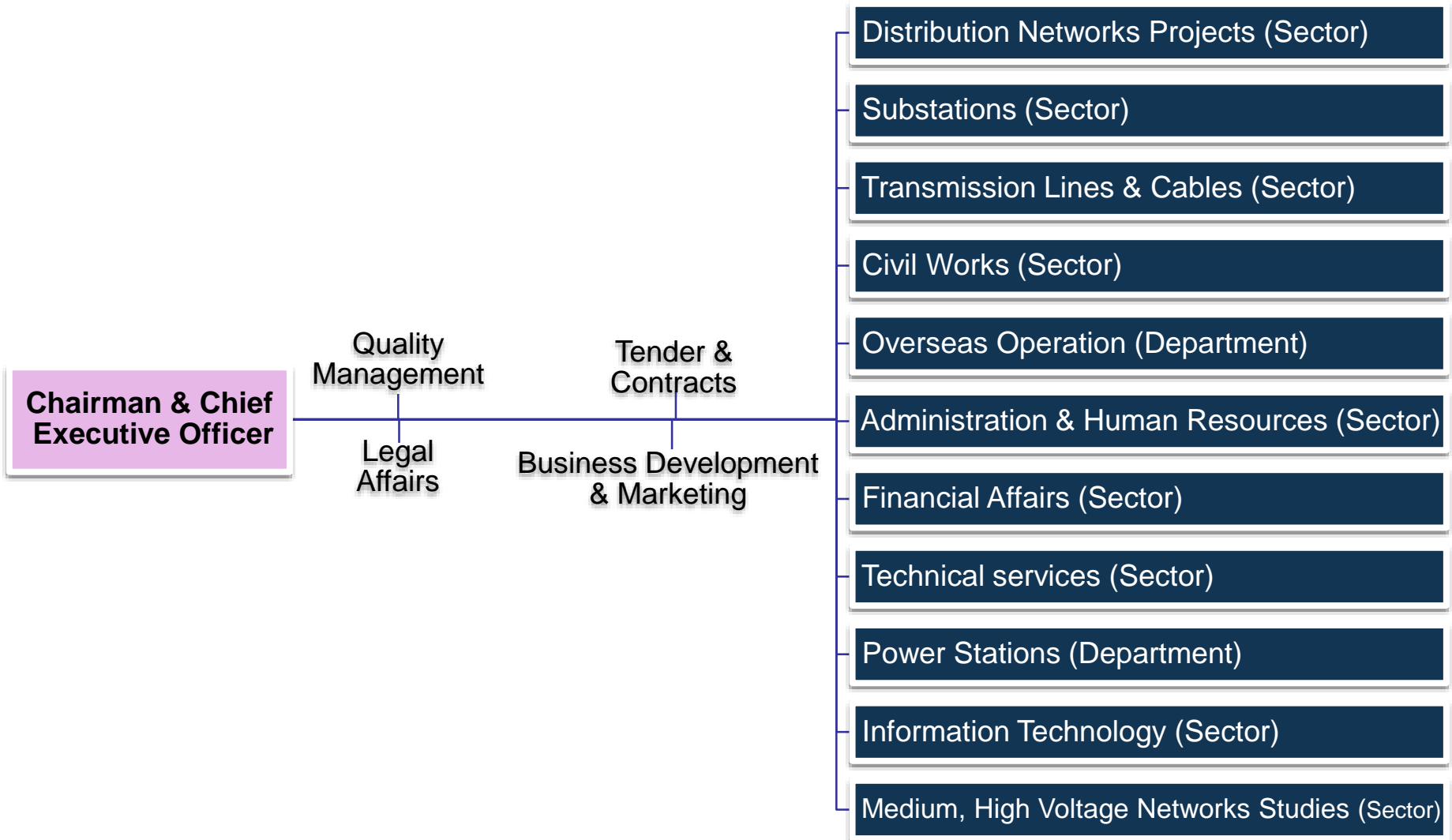
Consultants

- EPS has expanded its technical resources and engineering groups by employing consultants and specialists of the highest caliber as either inhouse or independent consultants to support the projects and project teams.

Facilities

- The Company has computer facilities and software packages which provide considerable support during the implementation of different contracts.
- EPS also maintains continuous liaison and special agreements with various specialized laboratories and research centers, in order to avail on their facilities and expertise whenever necessary.

Organization Structure



Key Personnel

EPS is managed by highly experienced group of managers. The key personnel are:

Name	Position
Eng. Hosni El Kholy	Chairman and Chief Executive Officer
Eng. Abd El –Rahman Abu El Ezz	Overseas Operation Supervision, Department Head
Eng. Refaat Y. Ghali	Power Station Projects, Manager
Eng. Asmaa El-Desouky	Substations, Sector Head
Eng. Osama El-Matarawy	Distribution Networks, Sector Head
Eng. Mohamed Saad	Civil Works, Sector Head

Key Personnel (Con.)

Name	Position
Eng. Amir Tadrous	Transmission Lines & Cables, Sector Head
Eng. Azza Khalil	Medium & High Voltage Networks Studies, Sector Head
Eng. Nevien Kheder	Information & Applications Automation, Sector Head
Eng. Mohamed Reda	Admin. & Human Resources, Sector Head
Acc. Osama Abdel Raouf	Financial Affairs, Sector Head
Eng. Hatem El Ghorory	Business Development
Eng. Osama El Seify	Technical Services, Sector Head

Ownership

EPS shares are held and equally divided between the following Authorities and Companies:

- Egyptian Electricity Holding Co.
- Rural Electrification Authority
- Nuclear Power Projects Authority
- Hydro Power Plants Authority
- Cairo Electricity Distribution Co.
- Alexandria Electricity Distribution Co.
- El Nasr Transformers & Electrical Products CO.
- General Co. for Electrical Projects.
- High Dam Electric & Industrial Projects Company.
- Misr Company for Mechanical and Electrical Projects.

The first seven shareholders are owned by the Ministry of Electricity and Energy, the next two shareholders are affiliated with the Ministry of Investment, while the last shareholder is a Privately Owned Company.

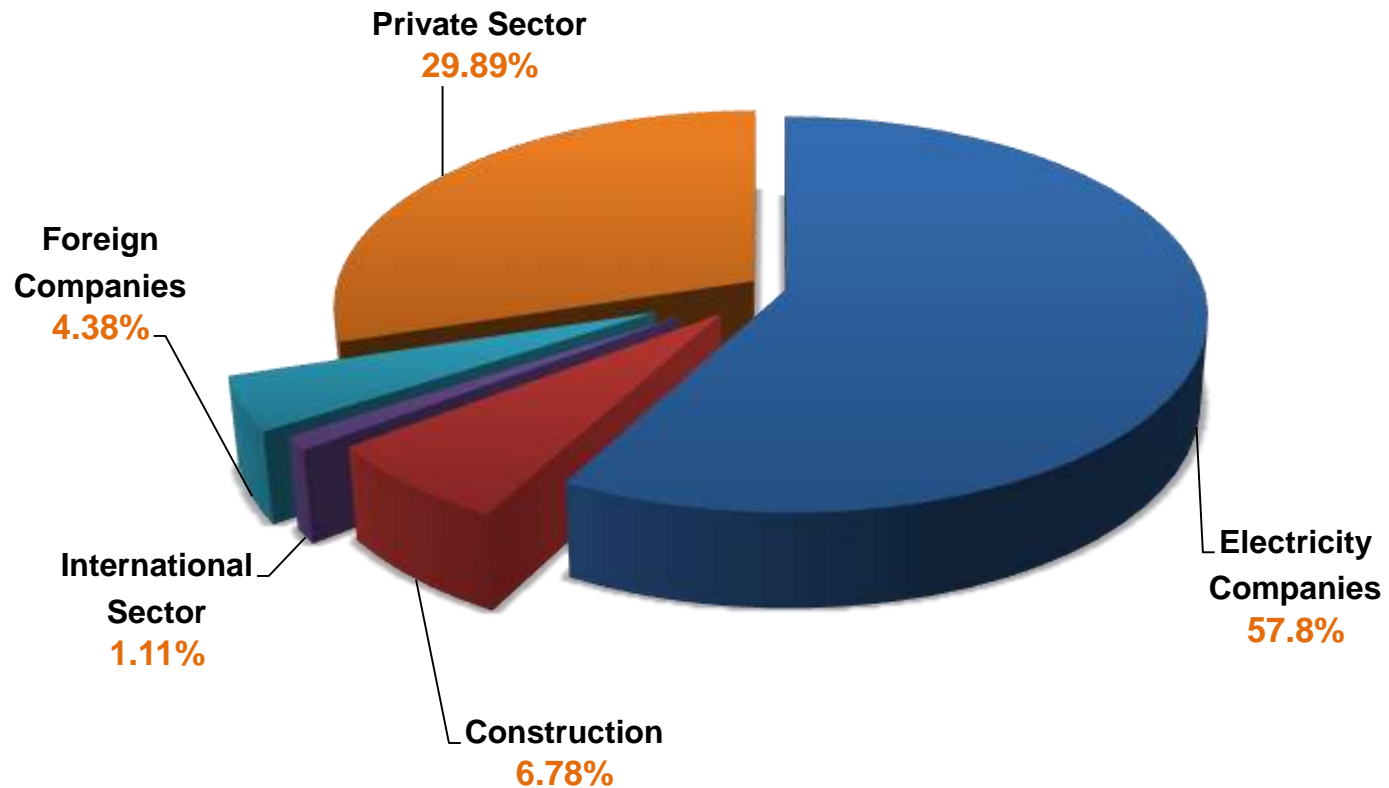
Major Organizations Recognizing EPS

EPS Company is recognized as a Consulting Firm by the agencies given below:

- The World Bank.
- The African Development Bank.
- The Arab Fund for Economic and Social Development.
- The Islamic Bank
- Kreditanstalt für Wiederaufbau (KfW).
- The United Nations Development Program.
- The Commission of the European Communities.
- European Investment Bank (EIB).

EPS is also a member of the Egyptian Syndicate of Engineers & the Federation of African Consultants.

Shareholders of the Fiscal Year 2015/2016



Activities and Services

Fields of Activities		Services
Distribution Networks	<ul style="list-style-type: none"> ○ Distribution Networks Projects ○ Rural Electrification Networks ○ Urban Supply Networks 	<ul style="list-style-type: none"> - Distribution Networks ○ Load Research and Load Forecasting ○ Field Measurements ○ M.V. and L.V. Networks Design ○ Short Term and Long Term Plans ○ Indoor & Outdoor Lighting ○ Optimization of Losses ○ Protection Coordination ○ Supervision for all Elements of Electrical Distribution Networks
Substations	<ul style="list-style-type: none"> ○ Substations up to 500/220KV, 220/66KV, 66/22/11KV 	<ul style="list-style-type: none"> - Substations ○ Engineering Services ○ Protection Coordination ○ Substation Control System ○ Switching Stations ○ Substation Interconnection ○ Communication System ○ Procurement Services ○ Project Management ○ Construction Supervision Services

Activities and Services (Con.)

Fields of Activities		Services
Transmission Line & Cables	<ul style="list-style-type: none"> ○ Transmission Lines up to 500Kv ○ Power Cables up to 220KV 	<ul style="list-style-type: none"> - Transmission Lines & Cables ○ Towers Electrical Design ○ Towers Spotting ○ Surveying Works ○ Soil Mechanics ○ Procurement Services ○ Construction Supervision
	<ul style="list-style-type: none"> ○ Design of Steel and Concrete Structures ○ Procurement Activities ○ Construction Supervision 	<ul style="list-style-type: none"> - Civil Works ○ Design & design review of steel structures for overhead transmission towers up to 500KV. ○ Design & design review of telecommunication towers up to 120 meter height. ○ Design & design review of civil works for substation GIS and AIS types up to 500KV include detailed design and shop drawings for control and switchgear buildings, transformers foundation, outdoor equipment supports, trenches and roads. ○ Prepare BOQ and material list structure and architecture items ○ Design reports and provide solution for the upgrade of existing overhead transmission lines, include steel towers and foundations repair and stiffening

Activities and Services (Con.)

Fields of Activities		Services
Power Station Projects	<ul style="list-style-type: none"> ○ Steam Plants ○ Gas Turbine Plants ○ Combined Cycle Plants ○ Diesel Plants ○ Hydro-Electric Plants ○ Wind Farms ○ Solar PV and CSP ○ Feasibility Studies 	<ul style="list-style-type: none"> - Power Station Projects ○ Studies and Project Investigations ○ Engineering Services ○ Procurement Services ○ Project Management ○ Construction Supervision ○ Operational and Maintenance Management
	<ul style="list-style-type: none"> ○ Substations ○ Transmission lines ○ Civil Works ○ Distribution networks ○ Power systems studies 	<ul style="list-style-type: none"> - Overseas Operations ○ Technical & Financial Offers ○ Conduct Contract Agreement ○ Prepare the Contracts documents ○ Project Management & Construction Supervision ○ Coordination between company participated sectors ○ Assigning EPS Experts for Specific Jobs

Activities and Services (Con.)

Fields of Activities		Services	
Medium & High Voltage Networks Studies	○ Interconnection Studies	-	Network Planning & Expansions
	○ Feasibility Studies	-	Power System Analysis
	○ Protection Coordination Studies	○	Load Flow & Short Circuit
	○ Network Planning	○	Dynamic Simulation
	○ Network Operation Studies	○	Wind Farm Simulation & Grid Access
	○ Load Management	○	Capacity and Reliability
	○ Energy Audit	○	Power Systems Optimization
	○ Load Forecast & Development of Distribution Network	○	OHTL Electromagnetic Interference
	○ Evaluation & Reduction Method for Technical & Non-Technical losses in Distribution Network	-	Energy Efficiency
	○ Power Quality Study	○	Network Losses Calculation & Optimization
	○ Energy Efficiency	○	Energy Audit
	○ Protection Coordination Studies for Distribution Network	○	Power Quality Analysis & Mitigation
	○ Electro Magnetic Effect on Pipelines	○	Renewable Energy Studies
	○ Outages & Interruption Studies for Distribution Network	-	Protection & Protection Coordination
	○ Renewable Energy	-	Institution Building
	○ Other Studies	-	Quality of Supply Studies
		-	Power Systems Control
		○	Technical Studies
		○	Feasibility Studies
		○	Engineering Services
		○	Project Management
		○	Procurement Services
		○	Construction Supervision
		○	Testing & Commissioning

Activities and Services (Con.)

Fields of Activities		Services
Medium & High Voltage Networks Studies	<ul style="list-style-type: none"> - Projects Control ○ Supervisory Control & Data Acquisition Systems (EMS/SCADA/DA) ○ Communication Networks (MW, RF, F.O) ○ Power Station Control Systems 	
Information & Applications Automation	<ul style="list-style-type: none"> ○ Business Modeling ○ Professional Support Systems ○ Management Information Systems and Management Support Systems ○ Computer Networks (LAN, WAN) ○ Billing Systems ○ Geographic Information Systems ○ ERP ○ CRM ○ Hospital Applications 	<ul style="list-style-type: none"> - Information & Applications Automation ○ Business System Architecture Modeling ○ S.W Engineering ○ Networking ○ Testing ○ Implementation ○ Web Design ○ High availability Solutions ○ Geographic Information Systems

1

Distribution Networks Projects

Projects served till the end of 2015/16 = **2834** Projects

Distribution Networks

Scope of work

- **Planning & Design supervision electrical networks for agricultural lands**
- **Planning & Design of Distribution networks for new cities**
- **Rehabilitation of distribution networks for rural area**
- **Power factor measurements and how to improve**

Planning & Design of M.V for
Electrical Networks for East Owinat

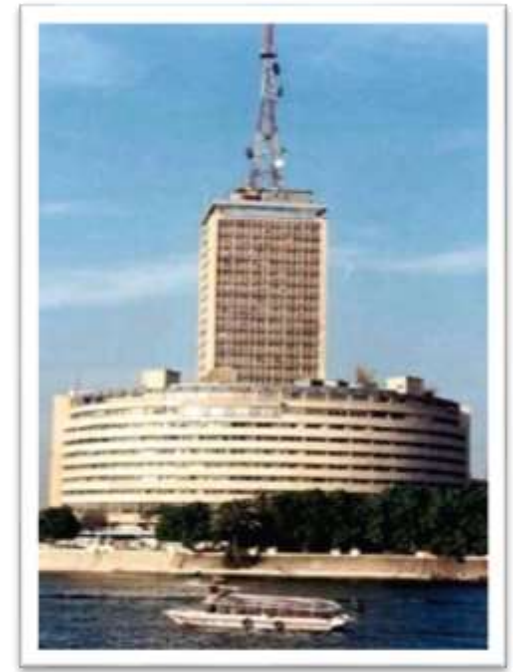


Distribution Networks

Total Project Capacity Served

Distributed among the following activities

- Planning and Design of M.V. for main Electrical Networks for East Owinat
- Planning, Design & Supervision for internal electrical networks for 17 plants (10000 Fed) for each Plant
- Planning & Design of Distribution Networks for 27 New Cities
- Design of Electrical Power Supply of 2500 Factories
- Rehabilitation of Distribution Networks for 35 Rural Areas
- Planning and Design of M.V. for main Electrical Networks for Toshka
- Electrical Supply Networks for 3 High – Riser Buildings
- Power Factor Improvement for 51 Plants
- Others 200 Projects



Consultancy Services for the Broadcast
Television Building (Maspero)

Major Projects

Interconnection Owainat East with the Electric National Grid

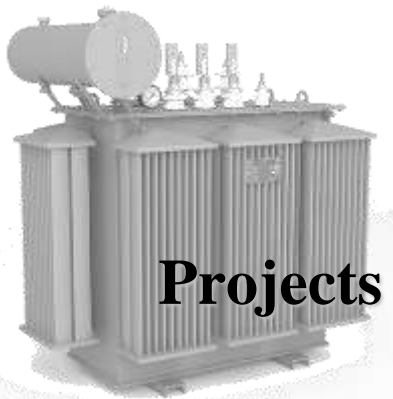
- Electric Distribution Networks for 14x10000 Feddan
- 1300 km 22 kv, 300 km 0.4 kV

Completion Date 2016



2

Substations



Projects served till the end of 2015/16 = 199 Projects



Substations

Scope of work

- Project study and design
- Feasibility study
- Bid Documents Preparation
- Bids Evaluation
- Prepare Technical Evaluation report with recommendation
- Prepare Final evaluation report with recommendation
- Prepare contract documents
- Project Management
- Detailed design review of the substation
- Site Supervision of construction, testing & commissioning till handing over

Substations

Total Project Capacity Served

38595 MVA

Distributed among the following voltage levels

- 500 kV S.S **9550 MVA**
- 380 kV S.S **3250 MVA**
- 220 kV S.S **16760 MVA**
- 132 kV S.S **1280 MVA**
- 66 kV S.S **7695 MVA**
- 33 kV S.S **60 MVA**



220 kV GIS Equipment



Kafr El Zayt 220 kV Outdoor Equipment

Substations

Medium voltage Switchgear



125 MVA 220/66/11
Transformers



Owinat East 2 x125 MVA + 3 x 25 MVA -
220/66/22 kV, Owinat I- 66/22 kV, Owinat II
- 66/22 kV Substations



Major Projects

Owainat East Project

- 220/66/22 kV Substation 2x125 MVA + 3x25 MVA
- 2 Substations 66/22 , 3x25 MVA each

Completion Date 2012



3

Overhead Transmission Lines (OHTL) & Under Ground Cables (UG)

Projects served till the end of 2015/16 = 701 Projects

Overhead Transmission Lines (OHTL) & Under Ground Cables (UG)

Scope of work

We design, manage and supervise the construction of transmission projects; we have successfully engineered many complex projects, providing the best solutions for transmission problems. Our scope includes but not limited to the following:

- Survey and geotechnical investigations
- Complete designs for Overhead Transmission lines using the most powerful software packages known in the business
- On site supervision of Transmission and Distribution Projects;
- Design and supervision of Underground Cable installations for high and medium voltage projects
- Preparation of tender/contract documents as well as tender evaluation, technically and financially
- Studies for upgrading the aged High Voltage and Medium Voltage networks
- Planning, feasibility studies and selection for the best economical and technical solutions for new and existing Overhead Transmission Lines

Overhead Transmission Lines (OHTL) & Under Ground Cables (UG)

Total Project Capacity Served

27418 km

Distributed among the following voltage levels

■ 500 kV T.L	8425	km
■ 400 kV T.L	1370	km
■ 380 kV T.L	950	km
■ 220 kV T.L	10695	km
■ 132 kV T.L	400	km
■ 66 kV T.L	4208	km
■ 34.5 kV T.L	36	km
■ 220 kV Cables	6	km
■ 66 kV Cables	1112	km
■ 11 kV	216	km



500 kV Single Circuit Tower



500 kV Double Circuit Tower

Overhead Transmission Lines (OHTL) & Under Ground Cables (UG)



Multi Circuits Towers Entrance
Of El-Siouf Substation

Abu Qir/ Kafr El Zayat/ Bassous
- 193 Km 500 kV



Major Projects

Interconnection Owainat East with the Electric National Grid

- 330 km OHTL 220 kV
- 105 km OHTL 66kV (Two lines)

Completion Date 2012



Major Projects (Con.)

Double Circuit OHTL Abu Qeer / Kafr El-ziat/ Basous 500 kV

- Total Length 195 km

Completion Date 2012



Abu Qeer/ Kafr El-ziat/ Basous 500 kV

Major Projects (Con.)

Single Circuit OHTL Abu Qeer/ Badr 500 kV

- Total Length 344 km

Completion Date 2015



Major Projects (Con.)

Double Circuit OHTL Samalut/ Suez Gulf 500 kV

- Total Length 257 km

Completion Date 2017



4

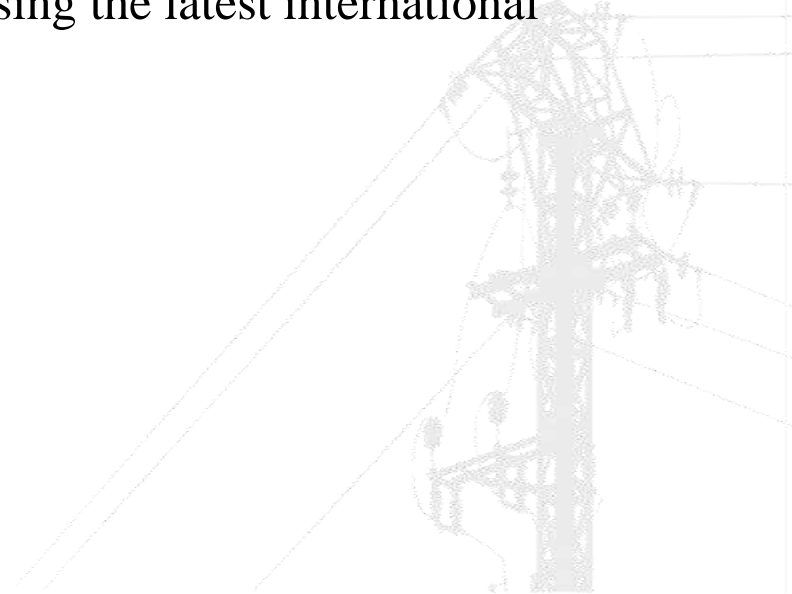
Civil Works

Projects served till the end of 2015/16 = **438** Projects



Scope of work

- EPS civil sector provides consultancy services for the structure and architecture design, preparation of technical specifications and tender documents, projects management, construction supervision especially for substations up to 500 KV, power generation, OHTL towers up to 500 KV and telecommunication towers.
- Services provided are given a competitive advantage as we apply the latest method of technology in the engineering by using the latest international computer systems and programs.



Civil Works

Total Project Capacity Served

438 Projects

Distributed among the following activities

- Overhead Transmission Line Projects 314
- Substations Projects 58
- Telecommunication Towers Projects 26
- Distribution Panels & Services Buildings Projects 36
- Consultancy Services for Industrial Projects 4



Loading test for Towers

Civil Works



Design & Construction Supervision
of MicroWave Towers

High Voltage testing station
Repair of Steel Structure
& Foundation



Civil Works



Deep Foundations (Piles) for OHTL



Foundation for OHTL

5

Power Stations Projects

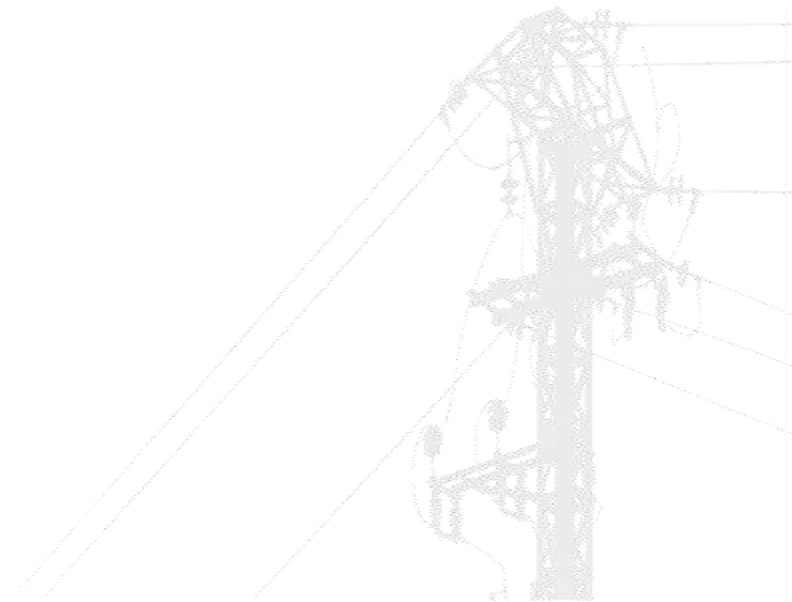
Projects served till the end of 2015/16 = **131** Projects



Power Stations Projects

Scope of work

- Power station services cover feasibility Studies & Project Investigations, Engineering Services, Procurement Services, Project Management & Construction Supervision, and Operation & Maintenance Services.



Power Stations Projects

Total generation Capacity Served

Distributed among the following types of Power Station

- Steam P.P.
- Gas Turbine P.P.
- Diesel P.P.
- Combined Cycle P
- Feasibility Studies
- Co-Generation P.P.
- Hydraulic P.P.
- Wind Farms
- Solar PV & CSP

Power Stations Projects

1-Steam P.P.

19 Projects with a total power reached 11545 MW

2-Gas turbine and Combined Cycle power plants:

7 Gas turbine projects and 12 Combined Cycle projects with a total power reached 11275 MW

3-Diesel Power Station:

10 Projects with a total power reached 85 MW

4-Co-Generation P.P:

Two Projects with a total power of 26.3 MW

5-Hydraulic Power Plant:

5 Projects with a total power reached 169.3 MW

Power Stations Projects

6-Wind Farm:

9 Projects with a total power of 895 MW distributed as follow:-

- NREA/DANIDA Zafarana Wind Farm Phase I (30 MW)
The project comprises 50 units of 600 kW. The units are running now.
- NREA/DANIDA Zafarana Wind Farm Phase II (30 MW)
The project includes 46 units of 660 kW. The farm is running now.
- NREA/KFW Zafarana Wind Farm Phase I (33 MW)
The farm is consisting of 55 wind energy converters of 600 kW.
The units are running now.
- NREA/KFW Zafarana Wind Farm Phase II (47 MW)
The project comprises 71 units of 660 kW the units are now running.
- Spanish 85 MW wind farm. EPS acted as main consultant for all local works.
The project comprises 100 turbines of 850 kW each.
- Kfw IV Zafarana 80 MW wind farm. EPS acted as sub-consultant with LI as main consultant. The project comprises 94 turbines of 850 kW capacities each.

Power Stations Projects

- JBIC Wind Power Plant Project at Zafarana (120 MW) – NREA sub-consultant with Decon. The project comprises 142 turbines of 850 kW capacities each.
- JICA 220 MW Wind Farm Power Plant at Gabal El-Zeit as Subconsultant to Lahmayer in the field of MV and LV networks.
- 250 MW BOO Wind Power Plant Project at Ras Ghareb as a Consultant for the main contractor (Orascom Construction).
EPS rendered feasibility studies for the following projects:-
- 220 MW with JICA on SAPROF (Special Assistance For Project Formation) Study for Gulf El Zeit Wind Power Plant Project in the Arab Republic of Egypt.
- 120 MW Italgen Wind Farm at Gulf El Zeit.
- 5 MW Co-generation project KC textile factor at 10th, of Ramadan City.

Power Stations Projects

7-Solar Energy:

EPS had signed joint venture agreements with the following entities:-

- British University Egypt (BUE).
- Solar Technology Advisor (STA).
- Engcotec Advanced Technology – Prof Dr. Ibrahim Samak.
- New and Renewable Energy Authority (NREA).
- NOKRASHY Engineering Gmbh Prof. Dr. Hany El Nokrashy.

In the field of Solar Power Stations Project.

- EPS were sub-consultant for the Engineering Services for Kuriemat Solar Power Station (140 MW) with the German Consultant Fitchner.
- EPS completed the project of installing 10 KW PV solar over its Building at Sheraton Heliopolis.
- EPS was selected by Egyptian Transmission Company as a short list with STA for offering consultancy services for 200 MW at Kom Ombo.

Power Stations Projects

- EPS provided support to Egyptian Electricity Transmission Company (EETC) for technical analysis and evaluation of the contractor's proposals in the field of wind farm and PV solar projects at Egypt with a capacity reaches 4300 MW BOO Projects.
- EPS performed pre-feasibility studies for PV solar system Canal Electric Distribution Company.
- EPS/Engcotec achieved the following activities in the first stage of New Tushka City (5000 KWp solar PV) project:
 - Performing the feasibility study.
 - Prepare the study of interconnection the solar park with the unified grid.
 - Preparing the tender documents for the project
 - Assist the Owner (NUCA) in the evaluation of the contractor offer.

Power Stations Projects

- The scope of EPS/Engcotec will also include the following tasks for the above project of New Touthka City:
 - Supervision of erection and commissioning
 - Prepare the provisional Acceptance Certificate (PAC)
- EPS prepared the feasibility study for 20 MW and 50 MW CSP for the Owner (NUCA).

8- Others:

7 Projects with a total power of 1816 MW covers the Maintenance Management systems (CMMS), rehabilitations and feasibility studies.

Power Stations Projects



Zafarana Wind Farms



Damietta Combined Cycle Power Station



Karama Power Plant



ESNA Hydro Power Plant

Major Projects

South Sudan

- Electric Power Station of
- Electric Power Station of

Bor City

2.4 MW

Yambio City

2.4 MW



Yambio Power plant over View



Bor Power Plant Main Entrance

Major Projects

South Sudan (CON.)

- Electric Power Station of
- Electric Power Station of

Rombik City

2.4 MW

Wau City`

2 MW



Wau Power plant over View



Diesel engines inside engine hall

Completion Date 2012

Major Projects

Owainat East Project

- 3 Electric power station 4 MVA each



Diesel engines inside engine hall

Completion Date 2012

6

Overseas Operations

Projects served till the end of 2015/16 = 26 Projects



Overseas Operations

Scope of work

- Conduct Pre-feasibility Study & Feasibility Study
- Study and prepare technical and financial tender documents according to client TOR
- Prepare contract documents between the client and EPS
- Prepare contract documents between the client and successful bidders
- Project management and construction supervision
- Coordination between company participated sectors
- Conduct contract / progress meetings
- Assign EPS experts to participate for providing engineering services for specific jobs
- Provide required assistance to the client during guarantee period

Overseas Operations

Currently Overseas Projects

Providing Consultancy Services to Oman Electricity Transmission Company (OETC) in Sultanate of Oman, Qatar General Electricity and Water Corporation (KAHRAMAA) in Qatar, Saudi Electricity Company (SEC) in Kingdom of Saudi Arabian, Dubai Electricity Water Authority (DEWA) in United Arab of Emirates, Republic of South Sudan Government, Burundi Government, General Electrical Company Of Libya (GECOL) in Libya and Algerian Energy Company (AEC) in Algerian for Substations, Transmission Lines, Civil Works, Distribution Networks and Power Systems Studies Projects.

Substation & Transmission Line Oman

Major Projects (Con.)

South Sudan

- Electric Distribution Network of Wau City 15 MW 11 kV

Completion Date 2012

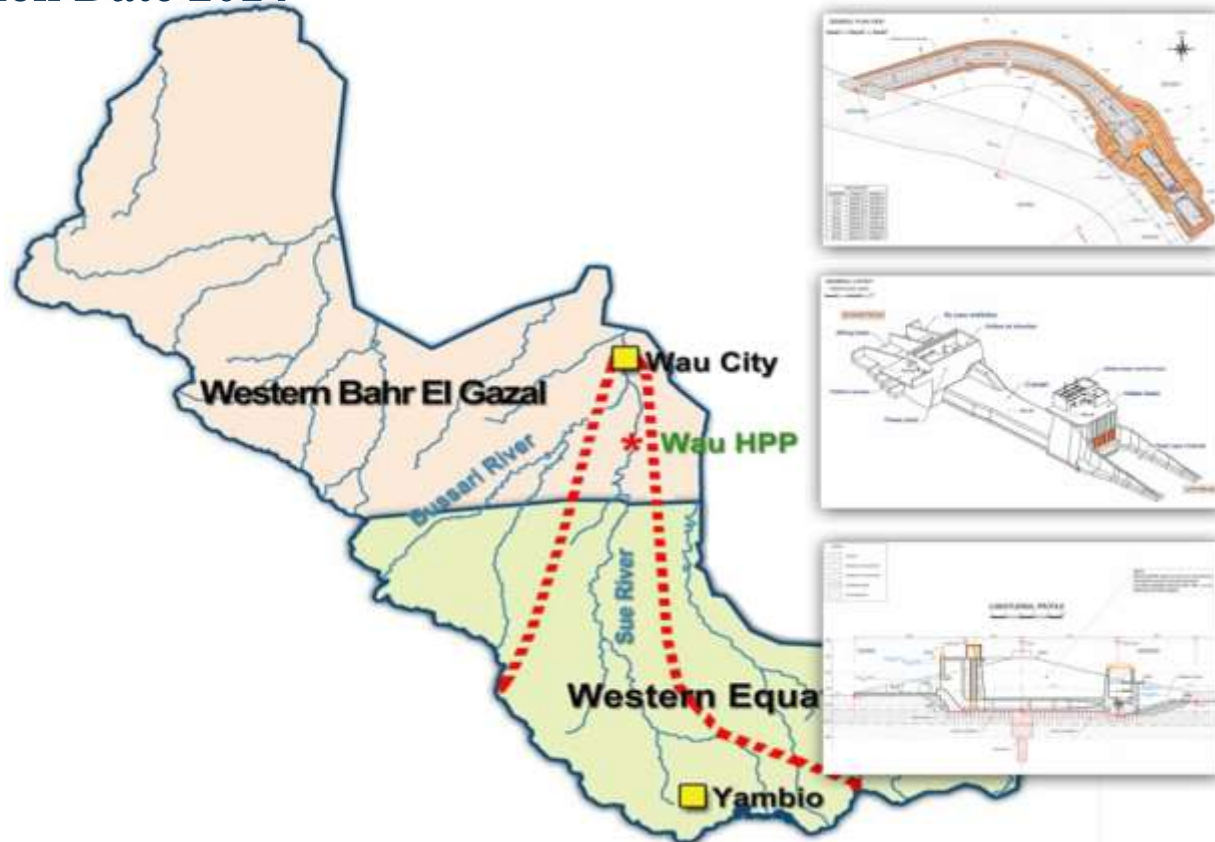


Major Projects (Con.)

South Sudan (con.)

- New Wau Hydropower on Sue River Dam with capacity 10.4 MW

Completion Date 2014



7

Medium & High Voltage Networks Studies

Projects served till the end of 2015/16 = **338** Projects



Medium & High Voltage Networks Studies

Scope of work

1. Electrical Network Planning Studies

1- Load forecast studies.

2- Planning of high and extra high voltage networks.

- Static studies:

- Load Flow Calculations Study.

- Three Phase and Single Phase Short Circuit Calculations Study.

- Contingency analysis.

- Dynamic studies:

- Dynamic studies have been performed to assess the system stability and to establish the stability limits following a set of critical faults on the power system. These studies assess the dynamic performance of transmission system modelling.

3- Rehabilitation and expansion of electrical power High voltage networks.

Medium & High Voltage Networks Studies

Scope of work (con.)

2. Interconnection studies

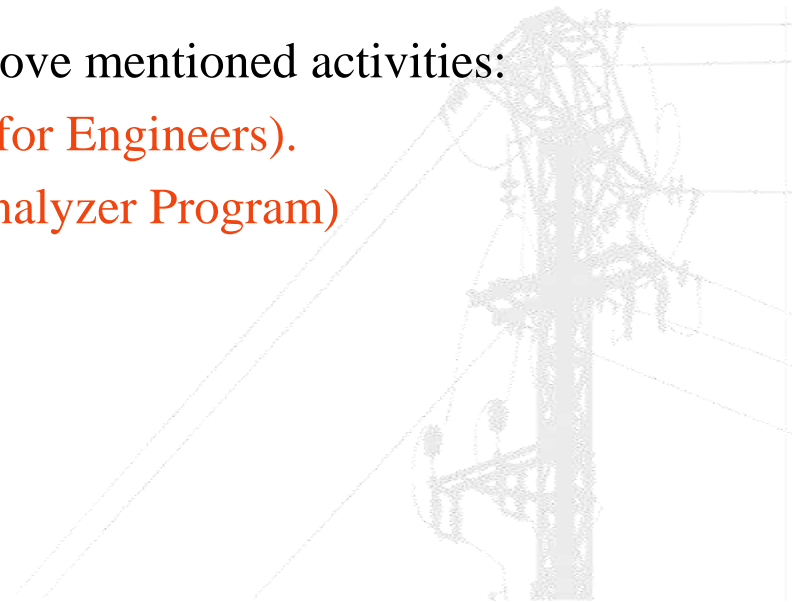
- 1- Interconnection of new and existing substations/power stations studies for the power system high voltage (unified network).

3. Interconnection studies for renewable energy plants

- 1- Study the impact of the connection of wind farm generations as well as the solar plant (Static and Dynamic studies)

The Software packages used in conducting the above mentioned activities:

- **PSS/E Ver.34** (Power System Simulator for Engineers).
- **ETAP Ver.14.0.0** (Electrical Transient Analyzer Program)



Medium & High Voltage Networks Studies

Detailed Engineering Design Services

A. Electrical Engineering Works:

The detailed Electrical Engineering includes the following activities:

1. Primary Engineering.

- In substation projects, the engineering works related to HV design and general installation part (primary engineering) include the following items:
 - Substation general layout & buildings drawing
 - Substation civil works guide and sizing parameters (Ex: Loads)
 - Power Transformers/Reactors/Capacitor Banks Civil work guide
 - Steel structure guide (Equipment Supports & Gentries)
 - Earthing Grid Calculation Notes and drawings & Earthing of the equipment
 - Lightning Protection Calculation Notes and drawings
 - Erection (Installation) drawings to be used by site team
 - HV/MV/LV cables routing details

Medium & High Voltage Networks Studies

Detailed Engineering Design Services (con.)

- HV Equipment Specification
- Technical purchasing requirements with detailed BOQ & associated technical specifications for the required material (as Cable Trays/Ladders, HV connectors etc.)

2. Secondary Engineering

In substation projects, the engineering works related to LV system control (Secondary Engineering) include the following items:

- HV/MV Substation Single Line Diagram (S.L.D)
- A/C – 380/220V S.L.D.
- D/C -220V S.L.D.
- D/C-48V S.L.D.
- Protection, Measuring & Metering principle S.L.D.
- Interlocking principle drawings (for AIS S/S).



Medium & High Voltage Networks Studies

Detailed Engineering Design Services (con.)

- LV Power Cables Sizing Calculation Notes.
- Batteries & Battery charges Sizing Calculation Notes.
- Aux. Transformer Sizing Calculation Notes.
- LV Power/Control Cables Cable Interconnection & Termination (Cable Book).
- A/C – D/C distribution principle.
- Technical purchasing requisitions with detailed BOQ & associated technical specifications for the required material (LV power and control cables, cable glands, etc.).
- Control & Protection Panel Schematic drawings.
- SAS drawings review and interface.

3. SCADA, Telecommunication and Control Systems

- Preparation of data book.
- Preparation of technical specification (Software, Hardware, Comm.)
- Evaluation of tender document.
- Project Management during execution.



Medium & High Voltage Networks Studies

Total Project Capacity Served

Distributed among the following activities

▪ Interconnection Studies	25
▪ Feasibility Studies	11
▪ Protection Coordination Studies	20
▪ Network Planning	30
▪ Network Operation Studies	11
▪ Load Management	4
▪ Energy Audit	43
▪ Load Forecast & Development of Distribution Network	21
▪ Evaluation & Reduction Method for Technical &	
▪ Non-Technical losses in Distribution Network	39
▪ Power Quality Study	4
▪ Energy Efficiency	9

Medium & High Voltage Networks Studies

Total Project Capacity Served (con.)

Distributed among the following activities

■ Protection Coordination Studies for Distribution Network	5
■ Electro Magnetic Effect on Pipelines	2
■ Outages & Interruption Studies for Distribution Network	1
■ Supervision of Installation & Construction of	
■ Distribution Network	1
■ Other Studies	64
■ Distribution Network Control Centres	16
■ Regional Control Centres	2
■ Communication Networks	3
■ Water Network Control Centres	1
■ Feasibility Studies	5
■ Control Centres Upgrade Studies	4
■ GIS/SCADA Interface	2
■ SCADA Adaptation (Installation and Testing)	4
■ DMS Training	4
■ Renewable Energy	4
○ Wind Farm	3

Medium & High Voltage Networks Studies

Quality of Supply Study Measurement of
Harmonics & Design of Filters

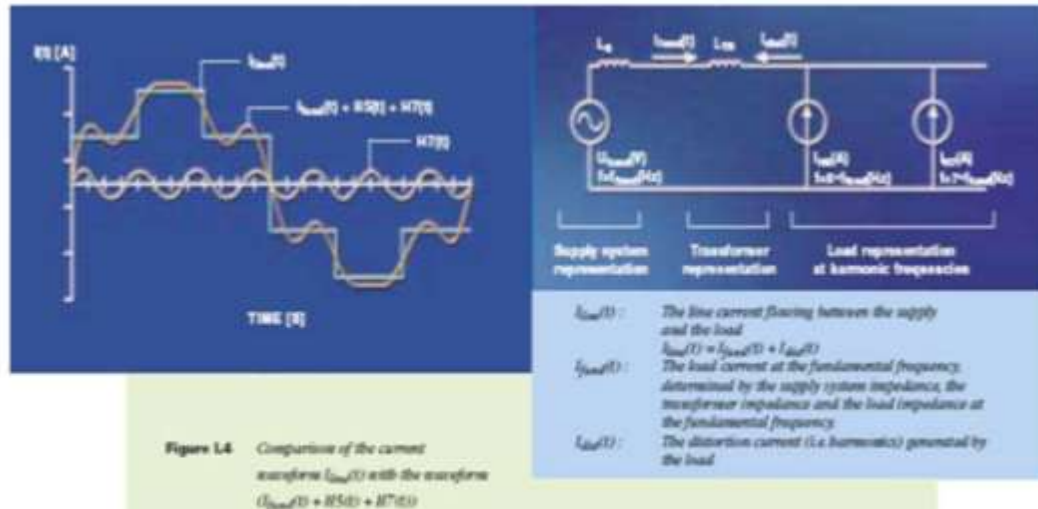


Figure L4 Comparison of the current waveform $i_{line}(t)$ with the waveform $(i_{fund}(t) + H5(t) + H7(t))$

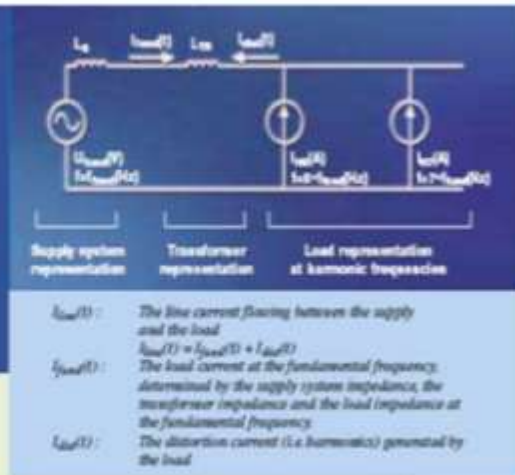
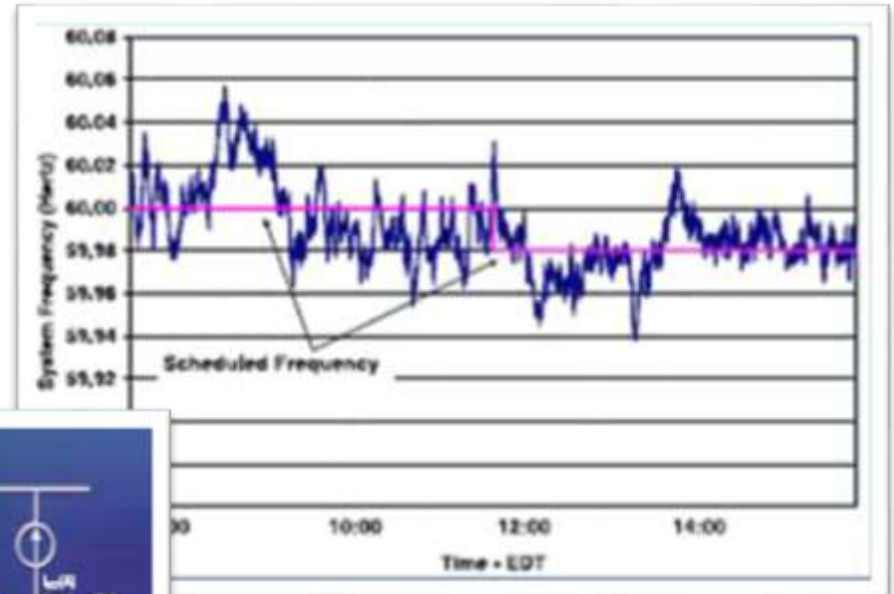


Figure L5 Schematic representation of the harmonic flow for the thyristor bridge load of figure 1.1



Dynamic Stability Simulation
for Load Shedding Study

8

Information Technology

Projects served till the end of 2015/16 = 488 Projects

Information Technology

The Role

- Take the project through a development cycle, from initial planning to production based on customer needs.
- Developing of Software Integrated Packages (Technical – Finance – Administrative)
- Design and Implementation of Integrated Solutions

Development Methodologies

- Software Engineering Development Process
- Business Modeling
- ERD Diagrams for Database
- Object Oriented Design
- Object Oriented Analysis
- Object Oriented Programming

We are providing a Qualified Technical Support Team for Applications and Databases.

We use the latest technologies of Computers, Servers, as well as the latest release of Databases such as Relational DB SYBASE, MS SQL Server, ORACLE , others

Information Technology

Our Mission

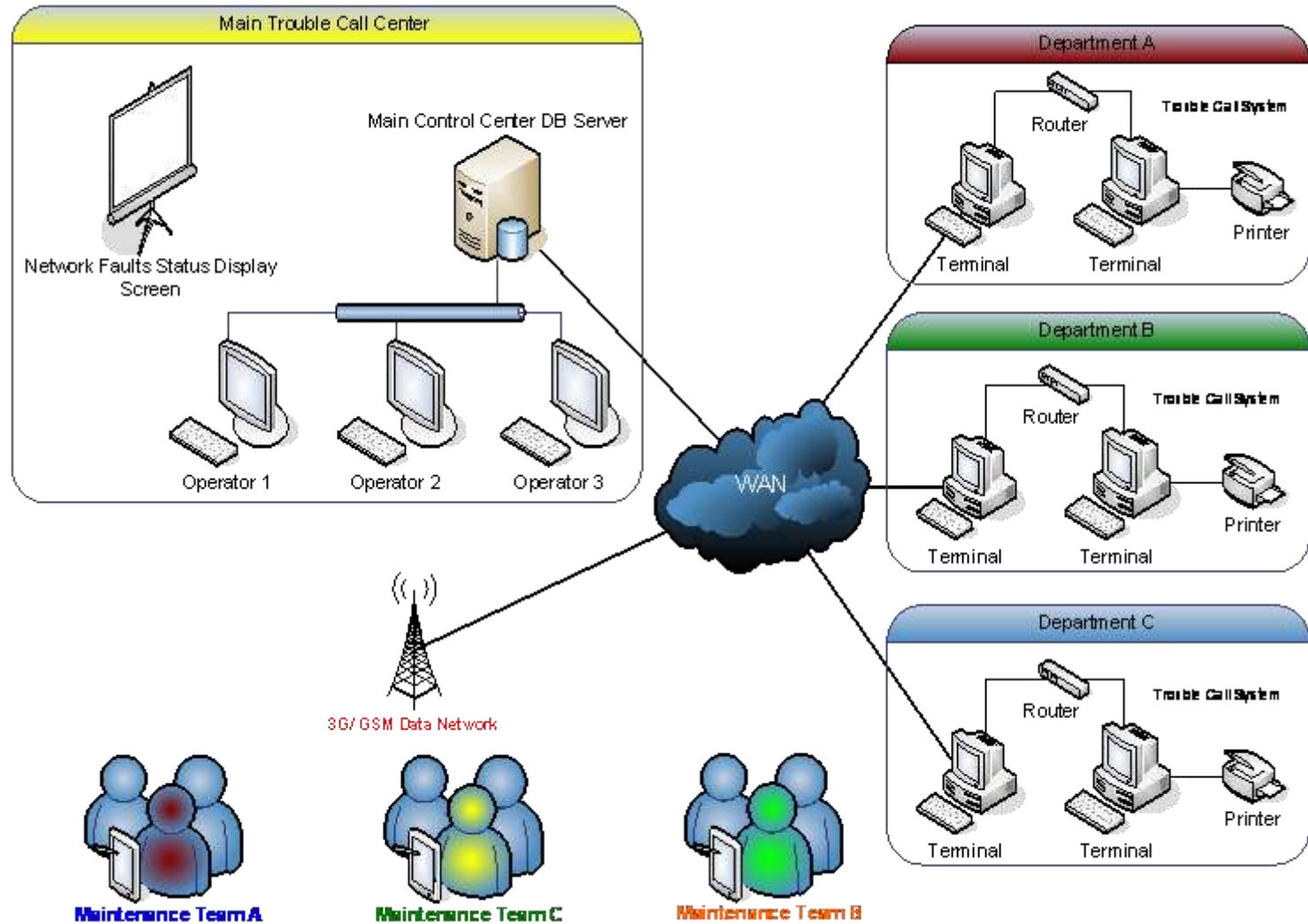
- Development Software Applications
 - Desktop Applications
 - Web Applications
 - Mobile Applications
- Maintained and support Applications
- Network solutions
- Hardware solutions and implementations

Information Technology

The activities as follows

1. Preparation of offers and contracting process and project management
2. Requirements Definition
3. Design
4. Development
5. Integration and Testing
6. Installation in customer site

Information Technology

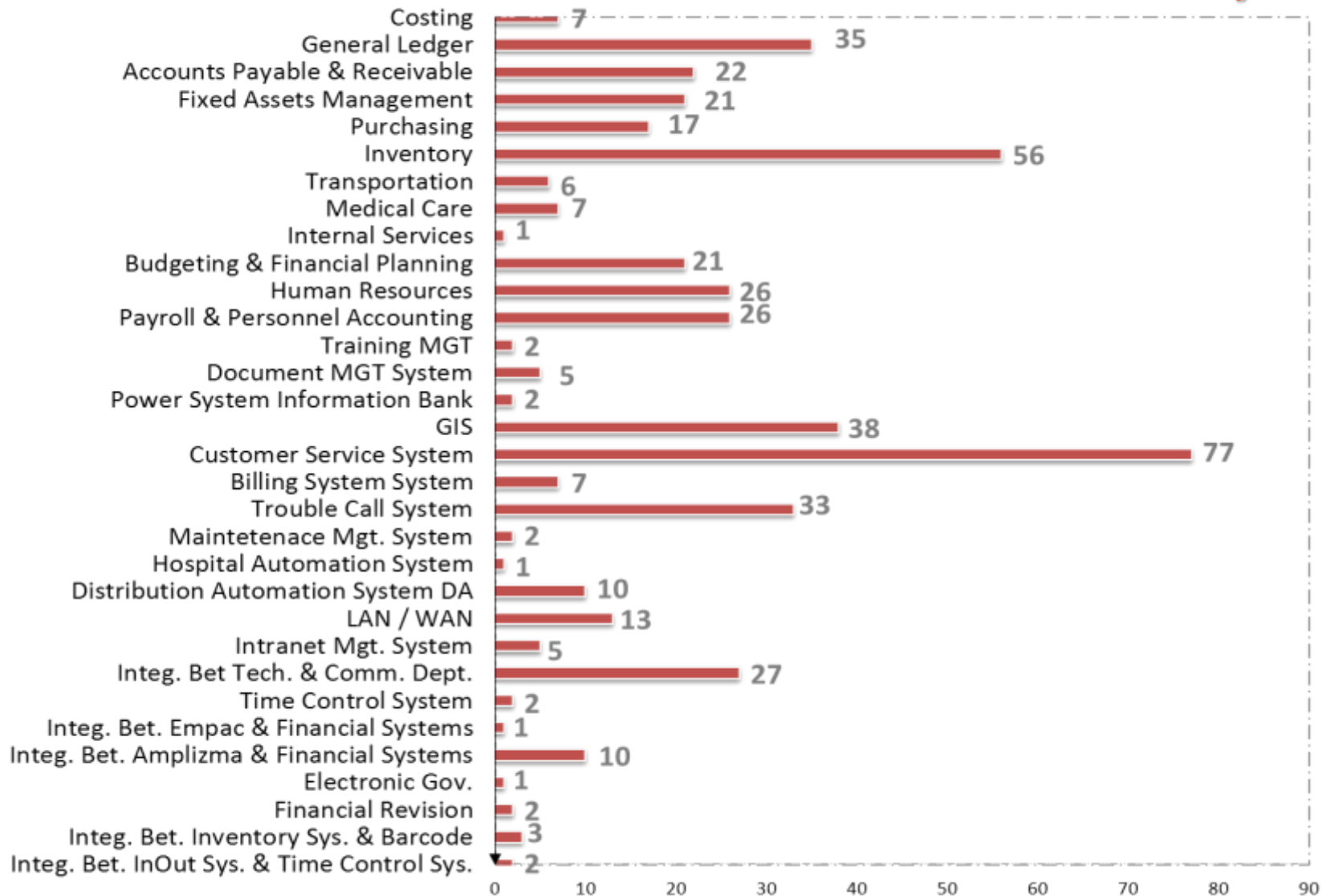


Trouble Call System

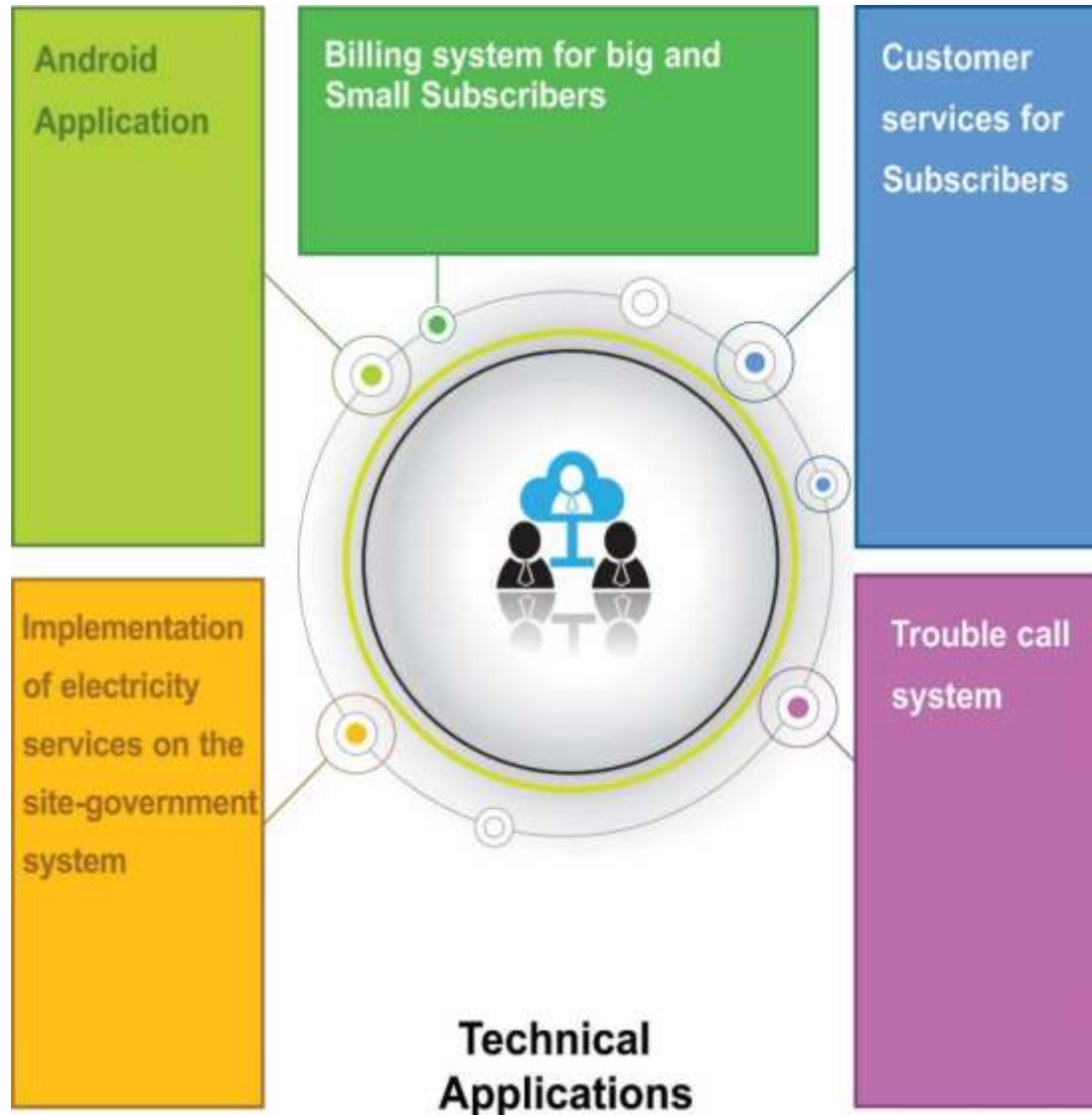
Information Technology

Total Project Capacity Served

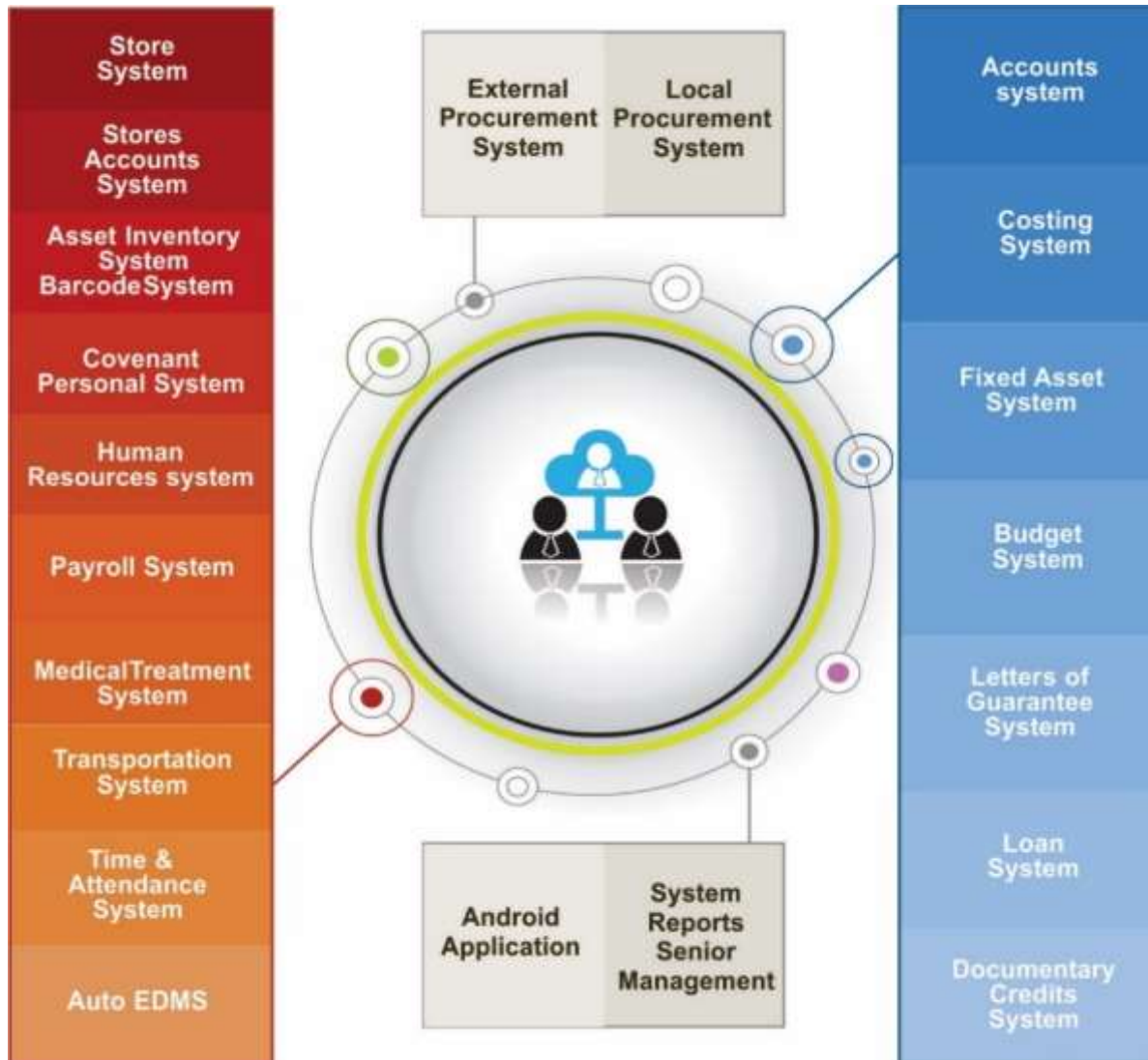
488 Projects



Information Technology

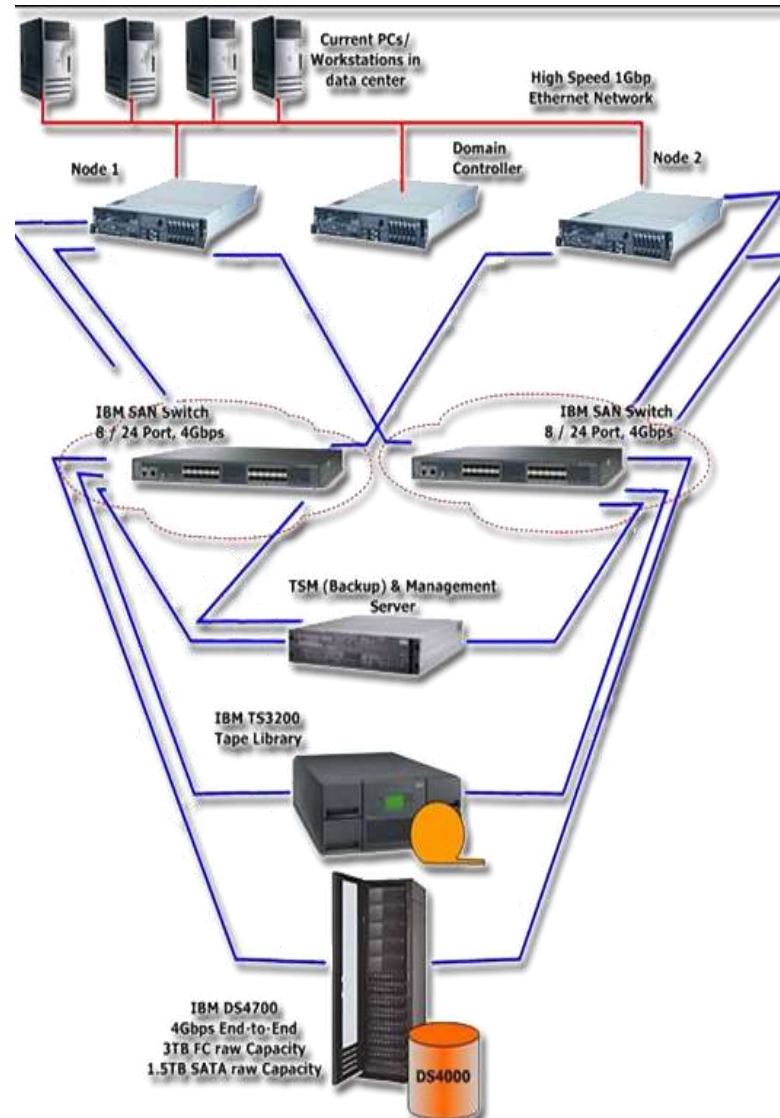


Information Technology



Financial and Administrative Application Systems

Information Technology



Electricity billing systems

HR Development & Training



HR Development & Training

Services

- Class-Room Training
- On Job Training
- Laboratory Testing
- Field Training
- Software Applications



EPS is providing different training programs. One goal of the training activity is to provide trainees with the specific knowledge and skills necessary to effectively perform their work. The training plan may also include, strategies for marketing. EPS training programs covering the fields of Power Stations Projects,

Transmission, Distribution, Control Communication, and Information Technology. Training courses are tailored to meet the needs of individuals, teams and organizations and are customized for developing their skills and improving their innovations and creativity.

HR Development & Training

Services (con.)

EPS has an equipped training facility for formal class-room, and theoretical training. The training programs are structured as a mix of theory, practical experience knowledge, and laboratory experiments.

EPS is using the laboratory facilities available at the Training Centres in Egypt.

The following training programs were provided at EPS's Training Centre:

- Planning of High Voltage Networks.
- Planning of Distribution Networks.
- Protection Coordination for Electrical Systems.
- Maintenance and Operation of Distribution Networks.
- Improvement of the Performance and efficiency of Power Stations.
(Steam, Gas Turbine, Combined, Cycle, Hydraulic, and Diesel Stations).
- Operation and Maintenance of all types of Power Stations.
- Shaft Alignment, Balancing and Vibration monitoring of different types and Power Stations Rotors.

HR Development & Training

Services (con.)

- Operation of Control Centres.
- Geographic Information Systems.
- Modern Transmission Lines Survey using Total Stations.
- Optimum Tower Spotting for High Voltage Transmission Lines using Computers.
- Short Term Unit Commitment for Power Stations.
- Large Scale Project Management.
- Legal Rules and Regulations for Electricity Companies.
- Distribution Networks Design & Planning.
- Safety in substations and switchyards.
- Dielectric oil testing and how to determine the transfer technical state form oil testing results.
- Dielectric gas SF6 testing technical state assignment
- Design and optimization of OHL using PLS-CADD and PLS. Tower SW.
- Electrical network study and planning and network losses reduction.



HR Development & Training

Services (con.)

- Occupation safety and health administration.
- Quality management system documentation control.
- Numerical bay control unit.
- Wireless techniques.
- New generation in telecommunication systems.
- Interfaces between different telecontrol protocols.
- Computerized maintenance.
- Feeder protection, remote terminal units and SCADA systems.
- System grounding design and planning.
- Power feeding for the isolated area far away from the general electrical network.
- Information evaluation.
- Civil survey.
- Using the international standards.
- Power quality improvement for different loads.

HR Development & Training

Services (con.)

- Planning and design methods for distribution for low voltage distribution networks.
 - Study of protection against electrical shocks.
 - Power Quality and energy saving.
 - Electrical network performance implement and new power management.
 - Project Management.
- **Among them 150 Trainees from the General Electricity Company of Libya, 50 from Public Electricity Corporation of Yemen, 45 from Southern Sudan Electricity Corporation (SSEC), 10 from Sultanate of Oman and 515 from Egyptian Electricity and Energy Sectors**

In addition to the above programs EPS has conducted training in the area of Software applications to the employees of the different customers. Training covered how to run and maintain the application software in addition to databases such as: ORACLE, SYBASE, ACCESS, etc. Also operating systems such as: Windows NT, Windows 2000, UNIX and open VMS are covered.

HR Development & Training

Services (con.)

- **The Number of Trainees till the end of 2015/16 , reached more than 2000 Trainee .**

The Training programs are to be organized at different locations as follows:

- o EPS's Training Center at Cairo.
- o Hotels.
- o Customer's premises.
- o MEE's and EDCS's laboratories training Centers and site visits to the power utilities.