

# A WORLD-CLASS INTEGRATED CONSTRUCTION, FACILITIES MANAGEMENT AND FABRICATION SERVICES PROVIDER



KHARAFI NATIONAL POWER & ENERGY - O&M SERVICES





## History

Kharafi National SAE was incorporated in 1999 as part of a carefully devised strategy for regional expansion in coordination with M.A.Kharafi's (MAK's) investment plans in Egypt and Africa. Since then it has become a key player in the EPCM and MEP market in Egypt.

During the early years MAK investments in Egypt were the main business focus. Accordingly, Kharafi National concentrated on projects related to the distribution of natural gas to consumers in Alexandria, Al-Salam and the Sixth of October City, and fast became the leading private contractor in terms of the number of customers converted to the use of gas for domestic purposes.

Kharafi National also participated in MAK investments in Marsa Alam town (Port-Ghalib) on the Red Sea, where the company executed most of the city's infrastructure works including power stations, potable water and sanitary water treatment stations, and the district cooling plant. It also carried out the EPCM works for the airport and several hotels.

Kharafi National has also completed several other contracts with MAK such as Addis Ababa Airport, The Gambia Beach Hotel and Kharafi Hotel in Addis Ababa, Ethiopia.

Kharafi National has expanded its market undertaking contracts with clients such as the American University in Cairo, the Marriot Hotel, NAT Gas, EMAAR, SODIC, NBE, and Ministry of Electricity (EAST DELTA CO.).

Building on the company's growing reputation in Egypt and Africa for quality work, timely execution and cost-effectiveness, Kharafi National has expanded its presence in the region by aggressively tendering for contracts with local and external clients.



Our uniquely broad range of services, experience, skills and capabilities to undertake a wide range of challenging projects enables us to deliver increasingly complex capital projects and facilities management services efficiently and to the highest of international quality standards to the Middle East and Africa markets.

Above all, we are committed to excellence in everything we do.



**We are encouraged by the mid to longer-term growth opportunities in our markets.**

## Kharafi National today

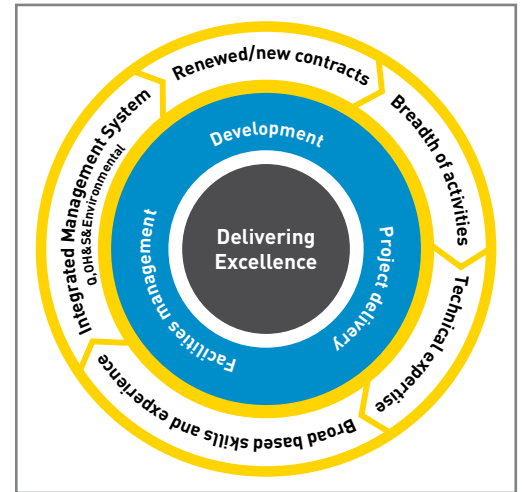
- Annual turnover exceeding 7 Billion EGP.
- A dynamic and progressive strategy designed to deliver a wider range of general and special Construction project development support across a wider geographical area.
- A dedicated focus on industry leading Safety and Quality control procedures and systems.
- A progressive Human Resource strategy designed to attract and reward the best people at all levels in our business.
- Strong relationships with the most prominent Engineering Procurement & Construction firms.
- A work shop covering all operations related to the Fabrication business.
- A Motor and Equipment fleets to support the projects' requirements.
- World class logistical warehousing facilities covering all operations.
- One of a kind Oracle ERP system with 20 modules.

**We have the people, the systems and controls to sustain our market-leading position. We are looking forward to a future of sustainable growth due to our expansion into growing markets.**

# Our Strategy

Kharafi National strategy is based on maximising the opportunities for synergy across the Company by firmly focusing on three key project stages: **Development, Project delivery and Facilities Management.**

This will enable us to generate the greatest amount of value across a wide range of projects.



# Our Beliefs

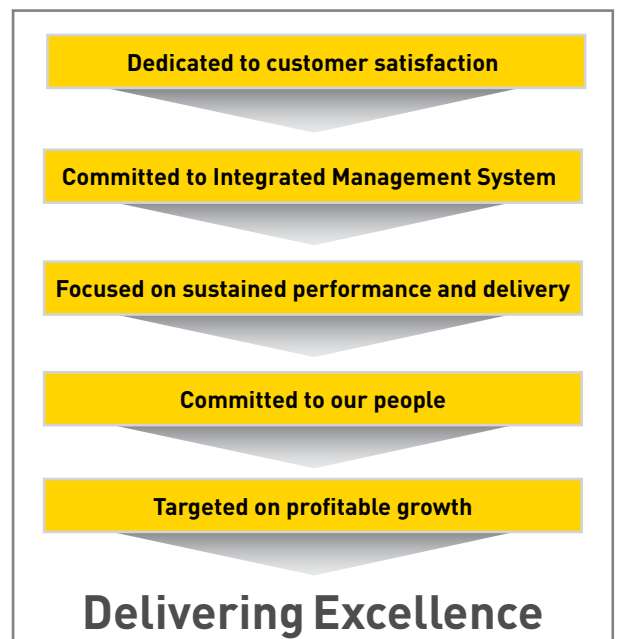
- We believe customer satisfaction is first and foremost.
- We believe we must meet our commitments together with a fiduciary responsibility to safety, health and the environment.
- We believe that our profits are a result of our performance and outstanding commitment to be a great company.
- We believe in providing personalized solutions and uncompromising quality for all our projects to best satisfy our client’s requirements.
- We believe that the future of Kharafi National lies in the growth and investment in our people.
- We believe in sustainable development and operations.
- We believe in exceeding both our clients’ as well as our own expectations by providing A culture of excellence.

## A Culture of Excellence

Our powerful belief in a Culture of Excellence is a constant reminder of the upcoming promising standards that we set ourselves and strive to maintain.

We have an absolute passion for excellence which runs through our entire organization at all levels and in everything we do. Sustaining and building on our competitive advantage comes through our commitment to our people throughout the business.

We aim to deliver growth as a direct result of our dedication to quality, excellence and perseverance.



# A versatile and dynamic construction, facilities management and fabrication developer

Kharafi National provides the complete spectrum of support, services and technical disciplines required to deliver every size and scope of capital projects.

Kharafi National operates principally in the Power & Energy, Water, Wastewater, Oil & Gas, Commercial & Industrial sectors in Middle East & Africa, and rapidly expanding its activities in terms of disciplines, industry sectors and geography.

We strive to deliver excellence throughout our business and are proud of our achievements as the leading integrated construction company in our region.

## Construction

Development, financing, construction management, operation and maintenance of major infrastructure projects. Integrated processes for the planning and delivery of major infrastructure projects as one of the leading general construction contractors.

## Facilities Management

Provides comprehensive and integrated services for institutional, commercial and industrial facilities. Delivers Hard & Soft services to a wide range of industries.

## Fabrication Services

Manufacture of a wide range of Duct works, Steel Structures, Aluminium works, Painting & Insulation works and repair works for the power, oil & gas, water, industrial and civil construction sectors.



Kharafi National has a goal to be the pre-eminent for putting together the complete package of financing, design, construction and operation/maintenance of major projects that are undertaken on Engineering, Procurement & Construction (EPC), build-own-operate-transfer (BOOT), build-own-operate (BOO), Infrastructure Project Development (IPD), public-private-partnership (PPP) or Turn Key basis.

The vertical integration of these activities has made Kharafi National's traditional role as one of an operational investor whereby we take full responsibility of EPC, IPD, BOOT, BOO, PPP and Turn key basis in several market sectors.

Kharafi National persistently cooperates with internationally renowned professional advisors and developers to support the support and realization of these projects.

As the leading operational investor in the region we are the developer of choice for equity partners, lenders and technology vendors.

## Power & Energy

Kharafi National provides innovative, effective solutions for power generation and HV, MV and LV power substation.

The Company aims to provide its clients with integrated processes that add value and are based on the latest technology and world class resources that will enhance life-styles, opportunities and growth in the Middle East and Africa.

The range of expertise within the Construction Power & Energy business encompasses project management, life-cycle solutions, basic and conceptual engineering, detailed engineering, procurement, traffic and logistics, installation, testing, commissioning and initial start-up across a broad spectrum of projects. Coupled with in-house resources in engineering, procurement, construction, commissioning, operation & maintenance, and fabrication, this gives the company its key competitive edge as a true 'one-stop' shop in the management and delivery of different projects in all sectors.

## Services:

- Major/Minor Overhauls
- Operation & Maintenance
- Auxiliary Equipment services maintenance
- Installation
- Commissioning
- Operational troubleshooting
- Rehabilitation, Modifications
- Alignment
- Combustion Inspections
- Power/Control system Upgrades
- Advanced Gas Path (AGP) upgrades
- Hot Gas Path Inspections
- RO Installation / Modification



## PROJECTS

### Al Shabab Power Station



**Plant Description:** Al Shabab power project is a simple cycle power generation project located near the vicinity of the existing Al Shabab power station. It consists of 8 outdoor gas turbines with a total capacity of 1000 MW.

**Owner:** East Delta Electricity Production Company

**Main Contractor:** Kharafi National

**Scope:** Engineering, Procurement and Construction (EPC) of Power Plant of **1000 MW (8 x 125 MW)**, Operation & Maintenance (O&M) for 2 years

**Year:** 2010 - 2011

**Engineering, Procurement & Construction of below items for 8 gas turbine units:**

- GTGs and accessories (Air inlet filters, Evaporative cooler, lube oil system, water injection, gas skid, Coolers...)
- Natural gas system with filters
- Exhaust Stack
- Distillate system with pumps, storage tank
- Instrument/Service air system
- Water wash systems
- Demineralized water system
- Service water system
- Firefighting/protection system
- Medium, Low voltage switchgears
- Isophase bus duct
- Administration, control, warehouse, switchgear buildings
- Distributed control system (DCS) , UPS
- Continuous emission monitoring system (CEMS)
- Electric power distribution system
- Field instruments, BOP Instruments
- Emergency diesel generator
- Sanitary and wastewater system
- Reverse Osmosis plant (RO)
- Radio communication system
- Potable water system
- Heating, Ventilation & air conditioning systems (HVAC)
- Lighting, Earthing, Cathodic protection
- Fire Alarm system
- BOP tanks and auxiliaries
- Commissioning, Startup of all systems
- Civil Works

## PROJECTS

### Al Shabab PS O&M Contract



### 2 years Operation & Maintenance (8 x 125 MW)

- Efficient and safe operation management of full plant
- O&M of technical facilities requiring complex maintenance
- O&M Support by experienced experts in advisory role to client's personnel
- O&M Management by responsible Managers, engineers and shift supervisor , charge engineers , technicians
- O&M Full Scope by responsible managers, engineers, shift supervisors and entire site staff; procurement of spares and third party services on operator`s costs



#### Other services:

- Troubleshooting/damage analysis
- Plant optimization and flexibilization
- Staff training
- Due diligence of existing energy plants
- Condition assessment of plants and components
- Creation of individual Power Plant Simulators and training
- Development and securing of operational communication facilities
- Predictive, corrective and preventive maintenance
- Following Safety rules of full plant
- Quality management
- Planning
- Status monitoring and durability
- Evaluation and performance monitoring of plant
- Asset Management
- Plant documentation management
- Reporting to technical asset manager
- Spare parts management



## PROJECTS

### Damietta Power Station



**Plant Description:** Damietta power project is a simple cycle power generation project located near the vicinity of the existing Damietta power station. It consists of four outdoor gas turbines with a total capacity of 500 MW

**Owner:** East Delta Electricity Production Company

**Main Contractor:** Kharafi National

**Scope:** Engineering, Procurement and Construction (EPC) of Power Plants of 500 MW (4 x 125 MW)

Operation & Maintenance (O&M) for 2 years

**Year:** 2010 - 2011

**Engineering, Procurement & Construction of below items for 4 gas turbine units:**

- GTGs and accessories (Air inlet filters, Evaporative cooler, lube oil system, water injection, gas skid, Coolers...)
- Natural gas system with filters
- Exhaust Stack
- Distillate system with pumps, storage tank
- Instrument/Service air system
- Water wash systems
- De-mineralized water system
- Service water system
- Firefighting/protection system
- Medium, Low voltage switchgears
- Isophase bus duct
- Administration, control, warehouse, switchgear buildings
- Distributed control system (DCS) , UPS
- Continuous emission monitoring system (CEMS)
- Electric power distribution system
- Field instruments, BOP Instruments
- Emergency diesel generator
- Sanitary and wastewater system
- Reverse Osmosis plant (RO)
- Radio communication system
- Potable water system
- Heating, Ventilation & air conditioning systems (HVAC)
- Lighting, Earthing, Cathodic protection
- Fire Alarm system
- BOP tanks and auxiliaries
- Commissioning, Startup of all systems
- Civil Works

## PROJECTS

### Damietta PS O&M Contract



### 2 years Operation & Maintenance (4 x 125 MW)

- Efficient and safe operation management of full plant
- O&M of technical facilities requiring complex maintenance
- O&M Support by experienced experts in advisory role to client's personnel
- O&M Management by responsible Managers, engineers and shift supervisor, charge engineers, technicians
- O&M Full Scope by responsible managers, engineers, shift supervisors and entire site staff; procurement of spares and third party services on operator's costs

#### Other services:

- Troubleshooting/damage analysis
- Plant optimization and flexibilization
- Staff training
- Due diligence of existing energy plants
- Condition assessment of plants and components
- Creation of individual Power Plant Simulators and training
- Development and securing of operational communication facilities
- Predictive, corrective and preventive maintenance
- Following Safety rules of full plant
- Quality management
- Planning
- Status monitoring and durability
- Evaluation and performance monitoring of plant
- Asset Management
- Plant documentation management
- Reporting to technical asset manager
- Spare parts management



## PROJECTS

### West Damietta Power Station



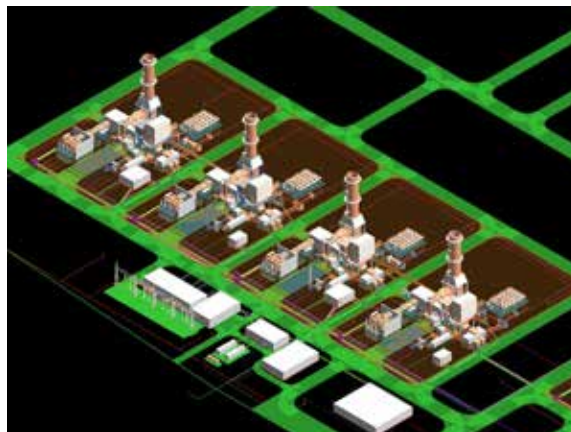
**Plant Description:** West Damietta power project is a simple cycle power generation project located within the vicinity of the existing West Damietta power station. It consists of 4 outdoor gas turbines with a total capacity of 500 MW.

**Owner:** East Delta Electricity Production Company

**Main Contractor:** Kharafi National

**Scope:** Engineering, Procurement and Construction (EPC) of Power Plants of 500 MW (4 x 125 MW) in West Damietta, Egypt. Operation & Maintenance (O&M) for 2 years

**Year:** 2011 - 2013



### Engineering, Procurement & Construction of below items for 4 gas turbine units:

- Engineering, Procurement & Construction of below items for 8 gas turbine units:
- GTGs and accessories (Air inlet filters, Evaporative cooler, lube oil system, water injection, gas skid, Coolers...)
- Natural gas system with filters
- Exhaust Stack
- Distillate system with pumps, storage tank
- Instrument/Service air system
- Water wash systems
- Demineralized water system
- Service water system
- Firefighting/protection system
- Medium, Low voltage switchgears
- Isophase bus duct
- Administration, control, warehouse, switchgear buildings
- Distributed control system (DCS), UPS
- Continuous emission monitoring system (CEMS)
- Electric power distribution system
- Field instruments, BOP Instruments
- Emergency diesel generator
- Sanitary and wastewater system
- Reverse Osmosis plant (RO)
- Radio communication system
- Potable water system
- Heating, Ventilation & air conditioning systems (HVAC)
- Lighting, Earthing, Cathodic protection
- Fire Alarm system
- BOP tanks and auxiliaries
- Commissioning, Startup of all systems
- Civil Works
- Fuel Oil leak detection system



## PROJECTS

### West Damietta PS O&M Contract



### 2 years Operation & Maintenance (4 x 125 MW)

- Efficient and safe operation management of full plant
- O&M of technical facilities requiring complex maintenance
- O&M Support by experienced experts in advisory role to client's personnel
- O&M Management by responsible Managers, engineers and shift supervisor, charge engineers, technicians
- O&M Full Scope by responsible managers, engineers, shift supervisors and entire site staff; procurement of spares and third party services on operator's costs

#### Other services:

- Troubleshooting/damage analysis
- Plant optimization and flexibilization
- Staff training
- Due diligence of existing energy plants
- Condition assessment of plants and components
- Creation of individual Power Plant Simulators and training
- Development and securing of operational communication facilities
- Predictive, corrective and preventive maintenance
- Following Safety rules of full plant
- Quality management
- Planning
- Status monitoring and durability
- Evaluation and performance monitoring of plant
- Asset Management
- Plant documentation management
- Reporting to technical asset manager
- Spare parts management



## PROJECTS

### Banha Power Station:

**Plant Description:** Banha power project includes a power block that consists of two 250 MW Combustion Turbine Generators (CTGs). Each one feeds exhaust gases to its respective unfired Heat Recovery Steam Generator (HRSG). Steam from the two HRSGs feeds one 250 MW, single reheat, condensing Steam Turbine Generator (STG).

**Owner:** Middle Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Installation of Evaporative cooler for 2 units:

**Year:** 2015

- Installation of feeding pumps
- Connecting water pipes
- Installation of flow meters, valves, temperature elements
- Commissioning and startup of complete system

**Scope:** Hot Gas Path Inspection 9FA Gas Turbine Unit1, Unit2

**Year:** 2016, 2017

- Remove Turbine Compartment Roof Sections
- Remove Exhaust and Inlet Duct Access Panels
- Remove Flame Detectors, spark plugs, Flex hoses, atomizing purge lines, liners, crossfire tubes, combustion casing, transition piece per Combustion Inspection Disassembly
- Take Turbine Clearance Checks
- Perform Combustion Component Inspection Operations
- Inspect First-, Second- and Third-Stage Nozzles, Buckets
- Inspect Shroud Blocks and Spline Seals
- Inspect Second- and Third-Stage Diaphragm Segments
- Install Turbine Thermocouples
- Take Final Rotor Position Checks
- Perform Combustion Inspection Reassembly
- Install Primary, Secondary, Tertiary and Quaternary Gas Fuel Lines
- Install Flame Detectors and Cooling Water Manifolds
- Install Turbine Compartment Roof Sections
- Reassemble Inlet and Exhaust Duct Access Panels
- Reassemble Turbine Compartment Roof Components

**Scope:** CI Inspection 9FA Gas Turbine Unit1, unit 2

- Replacement Old Fuel Nozzles
- Replacement Old Transition Pieces, Old Liners
- Replacement Old X- Fire Tubes
- Inspection of Flame Detectors
- Spark plugs assemblies



## PROJECTS

### El-Nubariya Power Station



**Plant Description:** Nubaria power project consists of three modules 750 MW comprised of two 250 MW combustion turbine generators (CTGs). Each one feeds exhaust gases to its respective heat recovery steam generator (HRSG) with no supplementary firing. Steam from the two HRSGs is fed to one 250 MW.

**Owner:** Middle Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** 9FA.03 DLN2.6 Upgrade for 2 units

**Year:** 2016

- Conversion to Low dP DLN 2.6+XD5 Combustion System
- New Dual Fuel Nozzle
- Accessories Modification for DLN 2.6+XD5 Dual Fuel upgrade.
- Haz. Gas Modification to existing catalytic bead System
- Atomizing air Heat Exchanger Upgrade
- Apply Combustor Dynamic Monitoring
- Wheel Space Thermocouples Replacement
- 9th and 13th Stage Extraction Flow Modulation (EFM)
- Apply Case Temperature Management (CTM)

**Scope:** Upgrade of MKVI Control to MKVIe for 2 units.

**Year:** 2016

- Controls SW upgrade as per requirement of this project
- MKVI to MKVIe migration and Historian upgrade
- Wiring modification
- I/O Cards replacement and connection
- Replacement Old X- Fire Tubes
- Inspection of Flame Detectors
- Spark plugs assemblies

**Scope:** AGP Package Upgrade for 2 units

**Year:** 2016

- Combustion retrofit system to extender configuration
- Combustion inspection
- Stage 2 bucket airfoils upgrade to gtd111 air cooled
- Stage 1 nozzle airfoils upgrade to improved cooling
- Casings add inner barrel counter borehole covers
- Stage 2 shroud honeycomb seals within casings
- Stage 3 shroud honeycomb seals within casings
- High pressure packing inner barrel brush seal
- Upgrade to new material stage one shroud hgp
- Stage 3 nozzle airfoils upgrade to improved efficiency
- Stage 3 buckets airfoils upgrade to improved efficiency
- Stage 1 shroud hot gas path upgrade to abradable coated
- System upgrades uprate to advanced gas path
- Stage 1 bucket airfoils gtd-111 directionally solidified
- System upgrades revise or optimize control curve

## PROJECTS

### Kurimat Power Station



**Plant Description:** Kurimat power project consists of two modules each module includes two 250 MW combustion turbine generators (CTGs). Each one feeds exhaust gases to its respective heat recovery steam generator (HRSG). Steam from two HRSGs feeds one 250 MW, reheat, condensing steam turbine generator (STG).

**Owner:** Middle Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** 9FA.03 DLN2.6 Upgrade for 2 units

**Year:** 2016, 2018

- Conversion to Low dP DLN 2.6+XD5 Combustion System
- New Dual Fuel Nozzle
- Accessories Modification for DLN 2.6+XD5 Dual Fuel upgrade.
- Haz. Gas Modification to existing catalytic bead System
- Atomizing air Heat Exchanger Upgrade
- Apply Combustor Dynamic Monitoring
- Wheel Space Thermocouples Replacement
- 9th and 13th Stage Extraction Flow Modulation (EFM)
- Apply Case Temperature Management (CTM)

**Scope:** Upgrade of MKVI Control to MKVIe for 2 units.

**Year:** 2016,2018

- Controls SW upgrade as per requirement of this project
- MKVI to MKVIe migration and Historian upgrade
- Wiring modification
- I/O Cards replacement and connection
- Replacement Old X- Fire Tubes
- Inspection of Flame Detectors
- Spark plugs assemblies

**Scope:** AGP Package Upgrade for 2 units

**Year:** 2016, 2018

- Combustion retrofit system to extender configuration
- Combustion inspection
- Stage 2 bucket airfoils upgrade to gtd111 air cooled
- Stage 1 nozzle airfoils upgrade to improved cooling
- Casings add inner barrel counter borehole covers
- Stage 2 shroud honeycomb seals within casings
- Stage 3 shroud honeycomb seals within casings
- High pressure packing inner barrel brush seal
- Upgrade to new material stage one shroud hgp
- Stage 3 nozzle airfoils upgrade to improved efficiency
- Stage 3 buckets airfoils upgrade to improved efficiency
- Stage 1 shroud hot gas path upgrade to abrasion coated
- System upgrades uprate to advanced gas path
- Stage 1 bucket airfoils gtd-111 directionally solidified
- System upgrades revise or optimize control curve



## PROJECTS

### Cairo North Power Station



**Plant Description:** Cairo North power project includes a power block that consists of two 250 MW combustion turbine generators (CTGs). Each one feeds exhaust gases to its respective heat recovery steam generator (HRSG). Steam from the two HRSGs feeds one 250 MW (nominal), reheat, condensing steam turbine generator (STG).

**Owner:** Cairo Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** 9FA.03 DLN2.6 Upgrade for 2 units

**Year:** 2017

- Conversion to Low dP DLN 2.6+XD5 Combustion System
- New Dual Fuel Nozzle
- Accessories Modification for DLN 2.6+XD5 Dual Fuel upgrade.
- Haz. Gas Modification to existing catalytic bead System
- Atomizing air Heat Exchanger Upgrade
- Apply Combustor Dynamic Monitoring
- Wheel Space Thermocouples Replacement
- 9th and 13th Stage Extraction Flow Modulation (EFM)
- Apply Case Temperature Management (CTM).

**Scope:** AGP Package Upgrade

**Year:** 2017

- Combustion retrofit system to extender configuration
- Combustion inspection
- Stage 2 bucket airfoils upgrade to gtd111 air cooled
- Stage 1 nozzle airfoils upgrade to improved cooling
- Casings add inner barrel counter borehole covers
- Stage 2 shroud honeycomb seals within casings
- Stage 3 shroud honeycomb seals within casings
- High pressure packing inner barrel brush seal
- Upgrade to new material stage one shroud hgp
- Stage 3 nozzle airfoils upgrade to improved efficiency
- Stage 3 buckets airfoils upgrade to improved efficiency
- Stage 1 shroud hot gas path upgrade to abrasion coated
- System upgrades uprate to advanced gas path
- Stage 1 bucket airfoils gtd-111 directionally solidified
- System upgrades revise or optimize control curve





## PROJECTS

### Hurghada Power Station



**Plant Description:** Hurghada power Plant consists of six Gas Turbines GE LM6000 (240 MW)

**Owner:** East Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Installation for Gas Compressor Lube Oil Tanks  
**Year:** 2016

**Scope:** Medium Voltage Cables Laying and Connection  
**Year:** 2017

- Check Spare Length in Cables
- Cable Replacement and termination
- Replace of Terminal Kit for All Cables
- Megger & Hippo Tests for Each Cable.

**Scope:** Dual Fuel upgrade of 6 units  
**Year:** 2018

- Civil Works for Liquid Fuel Skid Fixing
- Fixing Liquid Fuel Skid
- Devices & Material Inspection
- New Cables Inspection
- Pulling Cables from New Devices to JB & from JB to MTTB
- Erection New JBs
- Fabrication Required Conduits & Trays
- Cable Termination from JB to Control System
- Configuration Drivers of Metering Valves & Offset Adjustment
- RTDs & Thermocouples Function Check
- Pressure Transmitters Calibration & Adjustment
- Solenoid Valves Testing & Adjustment
- Commissioning support

**Scope:** RO plant piping lines replacement  
**Year:** 2019

- Replacement of RO plant SS piping
- Pipes welding and valves installation
- NDT for installed pipes
- Installation of Water tanks mechanical level indicators
- RO Plant Enclosure Fabrication and installation



## PROJECTS

### Sharm El Sheikh Power Station



**Plant Description:** Sharm El Sheikh power Plant consists of six Gas Turbines GE LM6000 (240 MW)

**Owner:** East Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Installation for Gas Compressor Lube Oil Tanks  
**Year:** 2016

- Dismantling Old Cooling System
- Installation of new Fin Fan Cooler
- Installation of new piping of the cooler
- Installation of new lube oil system
- Commissioning for cooling system and Lube Oil System

**Scope:** Maintenance for generator cooler  
**Year:** 2016

- Inspection for generator cooler parts
- Replacement of rusted and damaged pipes
- Leak checking before installation
- Install cooler
- System start up support

**Scope:** Medium Voltage Cables Laying and Connection  
**Year:** 2017

- Check Spare Length in Cables
- Cable Replacement and termination
- Replace of Terminal Kit for All Cables
- Megger & Hipot Tests for Each Cable.

**Scope:** Air Compressors Drain Line fabrication and installation

**Year:** 2019

- Fabrication and installation of piping lines
- NDT For installed piping

**Scope:** RO plant piping lines replacement  
**Year:** 2019

- Replacement of RO plant SS piping
- Pipes welding and valves installation
- NDT for installed pipes
- RO Plant Enclosure Fabrication and installation



## PROJECTS

### West Damietta Power Station



**Plant Description:** The West Damietta site is located on the Mediterranean Sea north coast, 15 km west of the New Damietta port near Damietta City.

The existing facility consists of four (4) outdoor combustion turbine generators (CTGs) GE Frame 9E (4 x 125 MW) installed and commissioned in 2011.

The new project accommodates one combined cycle module. It has a 4x4x1 configuration consisting of four (4) combustion turbines from the existing units. Each one feeds its exhaust gases to its respective heat recovery steam generator (HRSG), for a total of four (4) HRSGs and one 250 MW nominal steam turbine unit. Steam generated from the four (4) HRSGs feeds one 250 MW, non-reheat, condensing steam turbine generator (STG).

**Owner:** East Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Advance Gas Path for 4 units – GE Frame 9E

**Year:** 2017

- Combustion retrofit system to extender configuration
- Combustion inspection
- Stage 2 bucket airfoils upgrade to gtd111 air cooled
- Stage 1 nozzle airfoils upgrade to improved cooling
- Casings add inner barrel counter borehole covers
- Stage 2 shroud honeycomb seals within casings
- Stage 3 shroud honeycomb seals within casings
- High pressure packing inner barrel brush seal
- Upgrade to new material stage one shroud hgp
- Stage 3 nozzle airfoils upgrade to improved efficiency
- Stage 3 buckets airfoils upgrade to improved efficiency
- Stage 1 shroud hot gas path upgrade to abrasion coated
- System upgrades uprate to advanced gas path
- Stage 1 bucket airfoils gtd-111 directionally solidified
- System upgrades revise or optimize control curve

**Scope:** Load Tunnel ventilation duct modification

**Year:** 2020

- Ventilation fan duct fabrication and modification
- Ventilation Fan limit switches replacement
- System testing and start up, Load tunnel temperature sensors checking



## PROJECTS

### Assuit Power Station



**Plant Description:** Two combined cycle modules, Consists of 8 units GE Frame 9E gas turbines (Each of 125 MW), 8 HRSGs and 2 steam turbine units.

**Owner:** Upper Egypt Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** CI (Combustion Inspection) – 8 Units

**Year:** 2018

- Dismantling Old Fuel Nozzles
- Dismantling Old Transition Pieces
- Dismantling Old Flow Sleeves
- Dismantling Old Flexible Hoses
- Dismantling Old Liners
- Dismantling Old X- Fire Tubes
- Replacement Old Fuel Nozzles
- Replacement Old Transition Pieces
- Replacement Old Liners
- Replacement Old X- Fire Tubes
- Inspection of Flame Detectors
- Spark plugs assemblies

**Scope:** Repair of HP Evaporator inlet and outlet header for unit 1A

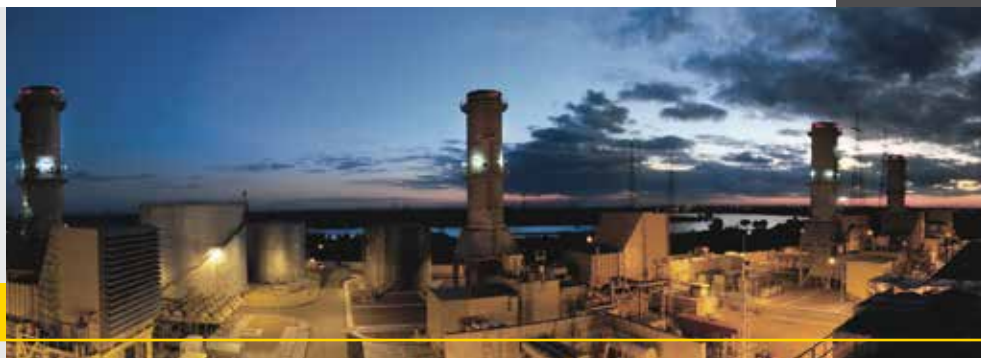
**Year:** 2019

- Inspection of welded joints for defects
- Cleaning, cutting defected joints
- Re-weld repaired joints
- Perform required NDE
- Fabricate and install HRSG drain extension module for the 4 units



## PROJECTS

### Damietta Power Station



**Plant Description:** Damietta Power Plant Consists of 3 combined cycle modules each one capacity of 750 MW (each module of 2x250 MW Gas turbines, 2 HRSG, 1x250 MW steam turbine)

**Owner:** East Delta Electricity Production Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Rehabilitation of HRSG 3&4

**Year:** 2018

- Replacement of HP Evaporator
- Replace the metallic expansion joint for textile expansion joint at the boiler inlet duct
- Restoration of HP Super-heater Outlet & Inlet Headers, reposition on the original position
- Maintenance in workshop the HP Super-heater Headers, replacing the all root bent tubes
- Realignment of HP SH tubes
- Replace of the HP-Economizer 1 Bank. Including the finned tubes and supports
- Maintenance in workshop the HP-Economizer Headers, replacing the all root bent tubes
- Replace of the Condensate Pre-Heater Bank, Including the finned tubes, and supports
- Maintenance in workshop the Condensate Pre-Heater headers, replacing the all root bent
- Flue gas Damper Maintenance (boiler inlet & by-pass stack)
- Installation of new flue gas Blind Plate (Blanking Plate), on the inlet duct of the boiler
- Installation of new magnetic system for HP Drum level measurement and LP Drum level
- Installation of 2 new valves for HP Feed Water system
- Installation of one new condensate Pre-Heater thermal control valve
- Replace of Hot Gas Duct Damaged
- Replace of defected tubes on the existing bank
- Hydraulic Test
- Site Preparation for performance test
- Chemical Cleaning assistant
- Removal and erection of insulation and refractory
- Non-Destructive Examinations (NDE)



## PROJECTS

Egyptian Petrochemical Co. P.P.



**Plant Description:** Brown-Boveri Gas Turbine frame 9D, (30MW)

**Owner:** Egyptian Petrochemical Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Control System Upgrades from ABB to MVIE  
**Year:** 2019

- Dismantling All Wiring Connections of Electrical Room
- Upgrade Control system From ABB to Mark Vie
- Upgrade Generator Protection Panel
- Upgrade Motor Control Center
- Upgrade UPS, DC Battery Charger
- Upgrade Signal Frequency Control System

**Scope:** Major inspection outage  
**Year:** 2019

- Performing Alignment Checks before starting
- Removing Turbine Instrumentation
- Removing the Gas Fuel Flex Hoses and Manifolds
- Removing the Air Extraction Pipe
- Performing Combustion Disassembly
- Performing Rotor Position Checks
- Removing Turbine Compartment Aft Wall
- Removing Turbine and compressor casing
- Measuring Rotor Thrust and Compressor Clearances
- Removing Turbine Buckets
- Performing Combustion Component Inspection
- Inspecting Bucket Locking & Bearing
- Reassembling Bearings, turbine buckets
- Installing compressor and turbine casing
- Performing Combustion Reassembly
- Installing the Gas Fuel Manifolds and Flex Hoses
- Reinstalling Turbine Instrumentation
- Rechecking Alignment, Prestart/Startup Checks

**Scope:** Turbine Control devices modification  
**Year:** 2019

- Modification of Fuel Oil Control Servomotor
- Modification of Gas Control Servomotor
- Apply Speed Sensors for Rotor Speed Measurement
- Modification of Fuel Oil Trip Shut Off Valve
- Replacement Lube Oil Pressure Switches by Pressure Transmitters
- Replacement of Vibration Sensors of Generator, Gearbox and Compressor Bearings
- Replacement Exhaust Thermocouples
- Cold Loop Check, Function check for All Signals

## PROJECTS

Besmaya Phase 3 – Iraq



**Owner:** MASS Global Holding

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Major inspection outage (2 units)

**Year:** 2020

- Performing Alignment Checks before starting
- Removing Turbine Instrumentation
- Removing the Gas Fuel Flex Hoses and Manifolds
- Removing the Air Extraction Pipe
- Performing Combustion Disassembly
- Performing Rotor Position Checks
- Removing Turbine Compartment Aft Wall
- Removing Turbine and compressor casing
- Measuring Rotor Thrust and Compressor Clearances
- Removing Turbine Buckets
- Performing Combustion Component Inspection
- Inspecting Bucket Locking & Bearing
- Reassembling Bearings, turbine buckets
- Installing compressor and turbine casing
- Performing Combustion Reassembly
- Installing the Gas Fuel Manifolds and Flex Hoses
- Reinstalling Turbine Instrumentation
- Rechecking Alignment, Pre-start/Startup Checks



## PROJECTS

Yanbu Power Plant- KSA



**Owner:** Saudi Electricity Company

**Main Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Rehabilitation of below systems for 6 units.

**Year:** 2018 - 2022

- Electrical and control systems
- Piping lines
- BOP devices, instruments
- Modification of Generator accessories
- Modifications of main, auxiliary transformers
- Solar system installation and commissioning
- Exhaust plenum modification
- Replacement of some electrical equipment
- Replacement of some mechanical equipment
- Gas modules modifications
- Exhaust blower fans modifications
- Inlet air filter rehabilitation
- Fire system modifications
- Vibration system replacement
- Replacement of electrical circuit breakers
- Replacement of the Gas Fuel Manifolds and Flex Hoses
- Rechecking Alignment, Prestart/Startup Checks





## PROJECTS

### El-Mostakbal City Substation

**Owner:** El-Mostakbal for urban development

**Consultant:** Shaker Consultancy Group

**Contractor:** Consortium of Kharafi National, Hyundai and DAEWOO. (KN is the Leader of the Consortium).

**Scope:** KN is EPC contractor

**Year:** 2017 – 2019

2 years O&M contract

#### 1. Engineering:

Designing for:

- a.Civil
- b.MEP
- c.Primary
- d.Secondary
- e.SAS

#### 2. Procurement:

Purchasing for all equipment and material.

#### 3. Construction:

- a.Civil Work.
- b.MEP construction and installation.
- c.Installation for GIS, Power Transformer, 22kV MV SWGR, Control & Protection Panels, Capacitor Banks, Cable Laying and Outdoor Equipment in Substation and Switching Station.



## PROJECTS

SOHAG EAST 500/220/66/22KV



**Owner:** EETC - Egyptian Electricity Transmission Co.

**Contractor:** Consortium of Kharafi National, Taikai and NHVS. (KN is the Leader of Consortium).

**Scope:** KN is EPC contractor

**Year:** 2018 – 2020

2 years O&M contract

### 1. Engineering:

Designing for:

- a. Civil
- b. MEP
- c. Primary
- d. Secondary
- e. SAS

### 2. Procurement:

Purchasing for all equipment and material.

### 3. Construction:

- a. Civil Work.
- b. MEP construction and installation.
- c. Installation for GIS, Power Transformer, 22KV MV SWGR, Control & Protection Panels, Capacitor Banks, Cable Laying and Outdoor Equipment in Substation and Switching Station.

## PROJECTS

Ext. of Assuit El Walida 220KV-S/S



**Owner:** EETC - Egyptian Electricity Transmission Co.

**Contractor:** Consortium of Kharafi National, Hyundai and DAEWOO. (KN is the Leader of Consortium).

**Scope:** KN is EPC contractor

**Year:** 2018 – 2020

2 years O&M contract

### 1. Engineering:

Designing for:

- a.Civil
- b.MEP
- c.Primary
- d.Secondary
- e.SAS

### 2. Procurement:

Purchasing for all equipment and material.

### 3. Construction:

- a.Civil Work.
- b.MEP construction and installation.
- c.Installation for GIS, Power Transformer, 22KV MV SWGR, Control& Protection Panels, Capacitor Banks, Cable Laying and Outdoor Equipment in Substation and Switching Station.



## PROJECTS

West Damietta 22/220/500kv GIS



**Owner:** EETC - Egyptian Electricity Transmission Co.

**Consultant:** Electric Power Systems Engineering Co. (EPS)

**Contractor:** Consortium of Al Kharafi - Taikai-NHVS  
(KN is the Leader of Consortium).

**Scope:** KN is EPC contractor

**Year:** 2018 – 2020

2 years O&M contract

### 1. Engineering:

Designing for:

- a.Civil
- b.MEP
- c.Primary
- d.Secondary
- e.SAS

### 2. Procurement:

Purchasing for all equipment and material.

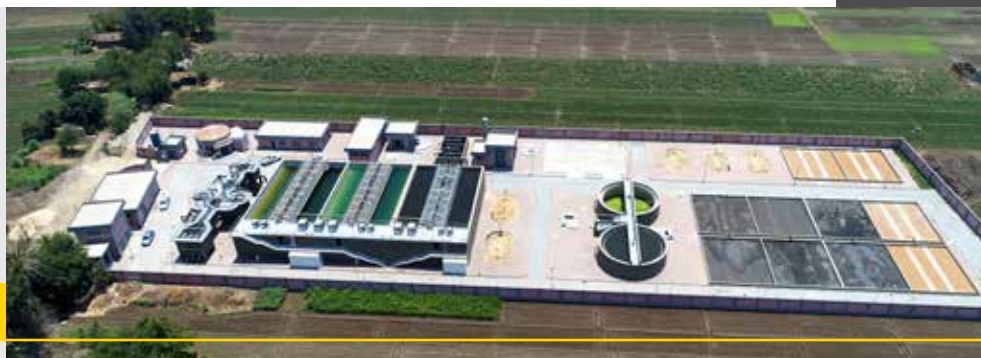
### 3. Construction:

- a.Civil Work.
- b.MEP construction and installation.
- c.Installation for GIS, Power Transformer, 22KV MV SWGR, Control & Protection Panels, Capacitor Banks, Cable Laying and Outdoor Equipment in Substation and Switching Station.



## PROJECTS

### Al-Birgat WWTP



**Contractor:** Kharafi National

**Scope:** EPC, Operation & Maintenance for 2 years

**Year:** 2020

Civil, Electrical, Mechanical, Control works for below systems (installation & Commissioning) :

- Inlet Chamber
- Screens chamber
- Sand Classifier
- Distribution Chamber
- Equalization tanks
- Blower shed
- Bio Block tanks
- Chlorine contact tanks
- Sludge pumping station
- Sludge thickener
- Drying beds
- Administration building
- Electrical room



## PROJECTS

### El-Mostakbal City WWTP



**Consultant:** AAW

**Contractor:** Kharafi National

**Scope:** EPC, Operation & Maintenance for 2 years

**Year:** 2021

Civil, Electrical, Mechanical, Control works for below systems (installation & Commissioning) :

- Influent pump pit
- Lucas tanks
- Pretreatment unit
- Cobra unit
- Sand filters
- Effluent tanks
- Thickener tank
- Polymer dosing tank
- Chlorine dosing tank
- Diesel generator
- VFD, MCC panels
- Administration building



## PROJECTS

### West Asyut Power plant

**Contractor:** General Electric Company

**Sub-Contractor:** Kharafi National

**Scope:** Construction, Commissioning

**Year:** 2021-2022

Civil, Electrical, Mechanical, Control works for below systems (installation & Commissioning):

- Dismantling of old filter house
- Dismantling of old devices , panels
- Dismantling of old transition duct
- Installation of new filter modules
- Installation of new supports
- Installation of new transition duct
- Installation of new filter elements
- Installation of new pulsing system
- Installation of new control panel
- Installation of new instruments
- Installation of fans
- Installation of new APU
- Installation of new air pipes
- Installation and connection of electrical and control cables



# Certificates

Our Integrated Management System is certified to ISO 9001:2015, ISO 45001:2018, ISO 14001:2015 and ISO 41001:2018 standards.



Kharafi National is certified by the American Society of Mechanical Engineers (ASME) and the National Board of Boiler and Pressure Vessel Inspectors as meeting the quality standards of those bodies.

The Company is authorised to apply the 'U', 'S', 'PP' and 'R' stamps.



Through our employees and strong capabilities in planning, finance, engineering, procurement, commissioning, operation & maintenance and facilities management, **KHARAFI NATIONAL** has secured its position as a Diversified Construction Developer in the Middle East and Africa.



## Culture of Excellence

Plot No. 50, North of Kattamia, Ain Sokhna Road,  
Third Settlement, New Cairo, Egypt.

Tel. : +20 2333 67 68 8

Fax : +20 2376 09 26 4

