



Reactive power compensation solutions



Enhancing power quality

PACKAGE SUB-STATION &
OPEN AREA &
OUTDOOR STORAGE AREA



CONTROL AND PROTECTION
PANEL MANUFACTURING
M V SWITCHGEAR MANUFACTURING



INGRESS PROTECTION
TEST FACILITY



OFFICES AND
TRAINING FACILITY



Who we are?

POWER ECONOMY is one of the market leaders in the Middle-East region for more than a decade in design, engineering, manufacture and supply of a wide range of low, medium and high voltage products & solutions that enhance the quality & reliability of power from LV to EHV systems.

Our Reactive Power Compensation, Distribution, Control & Protection, Automation and Metering solutions are developed through constant research and market innovation and cater to the needs of power transmission and distribution networks in Middle-East and Africa.

We offer solutions for both conventional & smart power networks in the domestic and

international T&D business.

At Power Economy, we strongly believe that our success and growth are direct derivatives of 'Customer Satisfaction' achieved through quality products delivered within time and cost frame.

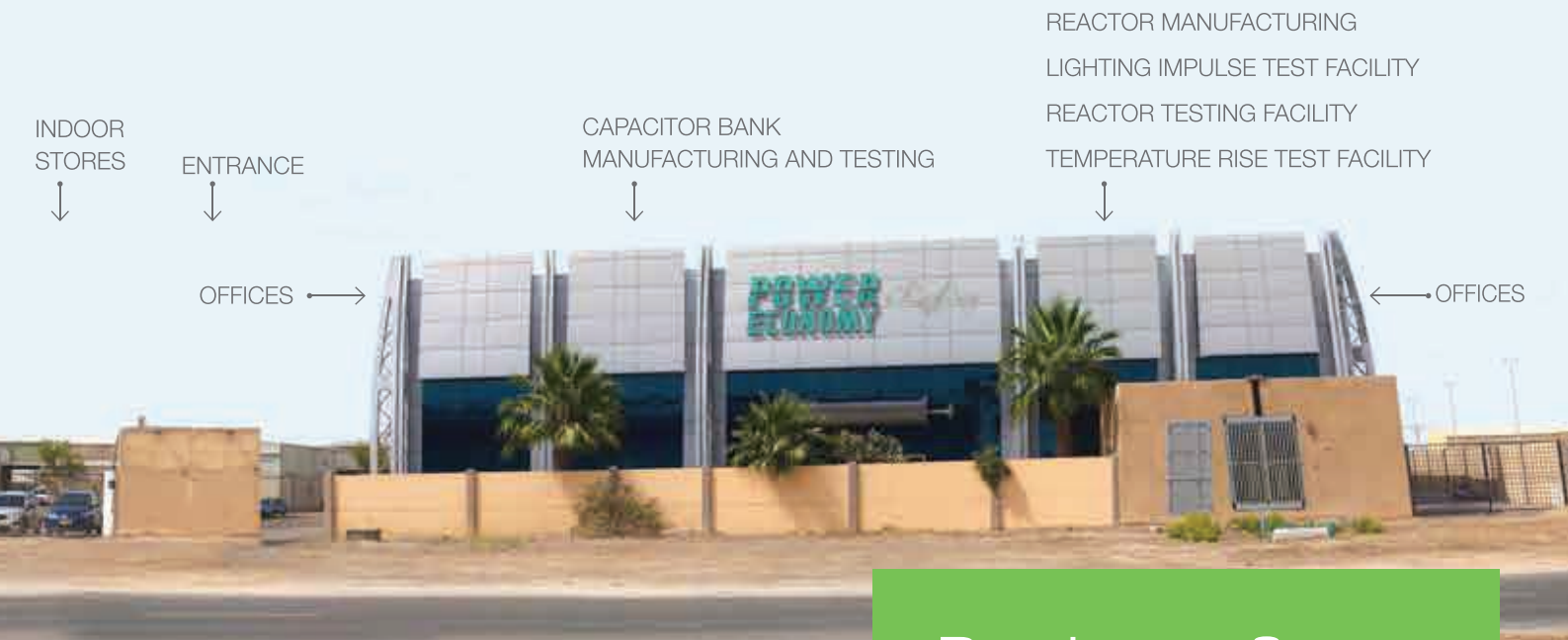
Our solutions, developed through constant innovation and research, benefit the customers by cutting down costs, improving efficiency and help them to achieve almost nil downtime.

We always ensure our innovation leads to environmental preservation through our energy-efficient products along with long term corporate responsibility efforts.



Power Economy assures quality of all its products and services. Business process of Power Economy is certified for ISO: 9001-2008 by TUV NORD.





Products & solutions

Our motto is 'Customised solutions through Engineering excellence'.

Our products and solutions are designed and manufactured by a team of highly experienced technocrats and developed with components sourced mainly from manufacturers in Europe, Japan and US & also reputed firms from rest of the world. This ensures not just quality and reliable power distribution but sets the benchmark for overall power quality in any region we work with.

- ⚡ Reactive power compensation
- ⚡ MV power distribution
- ⚡ LV power distribution
- ⚡ Control & protection
- ⚡ Substation automation
- ⚡ Advanced metering
- ⚡ Site support
- ⚡ Training facility

Manufacturing facility

- ▶ 16000 sq.m. State-of-the-art manufacturing facility in the industrial city of Abu Dhabi, UAE
- ▶ ERP system for work flow control and project management

People

- ▶ Core design team with more than 350 man-years of experience in power sector across all the 3 continents -Asia, Europe and North America.
- ▶ 150+ qualified workforce with more than 75 engineers.

Design

- ▶ PSCAD & ETAP for switching and harmonic study
- ▶ ELEC DES & AUTOCAD for Drawings & BOM preparation
- ▶ Maxwell 2D for magnetic field plots

Reactive power compensation solutions

- ▶ Solution for primary and secondary distribution systems of 3.6kV to 36kV voltage level
- ▶ Indoor or outdoor type installations with metal enclosed and open rack designs
- ▶ Current inrush limiting and detuned type designs with air or iron core reactors
- ▶ Fixed or switched type of designs with automatic control
- ▶ Low capacity Air core shunt reactors
- ▶ Type tested solutions as per IEC60871, IEC62271-200 and IEC60076-6
- ▶ Customised solutions engineered as per specific needs

Solutions

- Outdoor metal enclosed capacitor banks with air core series reactors
- Indoor metal enclosed capacitor banks with iron core series reactors
- Control and protection panels for capacitor banks
- Outdoor and Indoor capacitor banks of open execution type
- Outdoor capacitor banks for rural electricity distribution
- Air core reactors
- Iron core reactors
- Indoor metal enclosed automatic LV capacitor bank

Features

- ▶ Outdoor or Indoor type enclosures with steel base frame
- ▶ Outer skeleton of welded angle frame
- ▶ Cladding by 2/3mm sheet steel doors and covers painted with epoxy or polyester powder paint
- ▶ Gaskets used for providing required IP rating in outdoor type designs
- ▶ Canopy provided by additional steel sheets on top providing natural air column for heat protection
- ▶ All cable termination on bottom with aluminium gland plates
- ▶ Open rack and pole mounted solutions with high creepage distances
- ▶ Internally or externally fused capacitor units
- ▶ Type tested switching devices validated for back to back switching capability
- ▶ Naturally cooled enclosures with high IP ratings
- ▶ Electrical & mechanical interlocks for safe operation
- ▶ Option of stages to be segregated with through type bushings
- ▶ Option of outdoor type detuning reactors to be installed in separate FRP enclosure
- ▶ Indoor control and Protection panel engineered for specific protection and control needs

Technical particulars

Rated voltage	3.6kV to 36kV
Rated frequency	50Hz/60Hz
Rated peak withstand current	up to 80kA peak
Rated short time withstand current for busbars	up to 31.5kA/3sec
Power frequency withstand voltage	up to 70kV (60sec)
Lightning impulse withstand voltage	up to 170kV peak
Degree of protection for enclosure	up to IP55
Maximum design ambient temperature	up to 55°C

Type testing

The capacitor bank solutions are type tested, as relevant for following tests as per IEC60871 and IEC62271-200. Our Reactors are type tested as per IEC60076-6.

- ▶ Short time withstand current test on main circuit
- ▶ Short time withstand current on earth circuit
- ▶ Impulse voltage withstand test
- ▶ Power frequency voltage withstand test
- ▶ Temperature rise test
- ▶ Ingress protection test



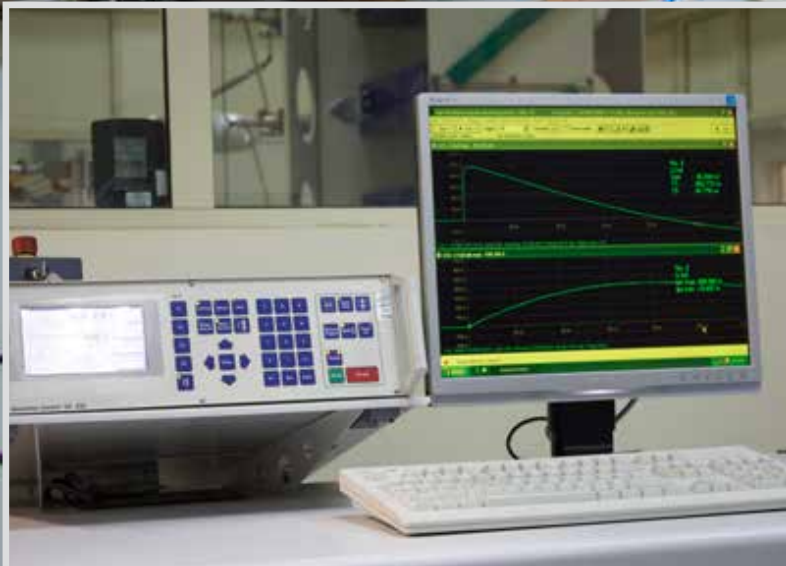
TESTING ACTIVITIES



POWER ECONOMY MIDDLE EAST CO. LLC

Two three-phase air core tuning reactor setups of from Power Economy Middle East Co. LLC, Abu Dhabi, UAE, successfully passed short-circuit tests at KEMA Laboratories, Arnhem. One horizontal arrangement and one stacked-up arrangement have proven to withstand short-circuit tests including routine tests. With this success they are entitled to receive short-circuit certificates based on IEC 60076-6. These two setups will be put in service in the system owned by National Grid, Riyadh, Saudi Arabia.





Impulse voltage withstand testing

Verification of basic insulation levels for lightning impulse voltage withstand can be verified at in-house impulse test laboratory of Power Economy. The test setup can test till 600kV, 60kJ of lightning impulse. Capacitor banks are tested as type test on busbars for impulse voltage withstand. All reactors are tested as routine test for with stand of lightning impulse for the required BIL.





INGRESS PROTECTION TEST



WATER PROTECTION TEST



Ingress protection testing

Outdoor type enclosures supplied by Power Economy are verified for stringent ingress protection requirements of IP54 and IP55. Type test is conducted on metal enclosures for validation of required IP rating. The in-house ingress protection test lab is equipped to test up to digit 6 for dust and up to digit 5 for water protection.



CURRENT INJECTION
BUSBARS

TEST OBJECT





Temperature rise testing

Capacitor bank solutions can be type tested for temperature rise test. The test setup can inject till 5000A of busbar currents. Temperature from thermocouples are recorded using automatic temperature data logger.

Training centre

Power Economy has built ultra modern training centre along with functional display centre to provide hands on training to its client. The main training room suitable for 30 trainees is installed with modern audio visual system for providing class room trainings.

The training centre is also attached with a functional display centre with products connected to simulated supplies. The training centre is

equipped to provide complete multi-dimensional trainings to client on subjects of application, operation, control, protection and maintenance of various Power Economy products.





Outdoor metal enclosed capacitor banks with air core series reactors

General specification

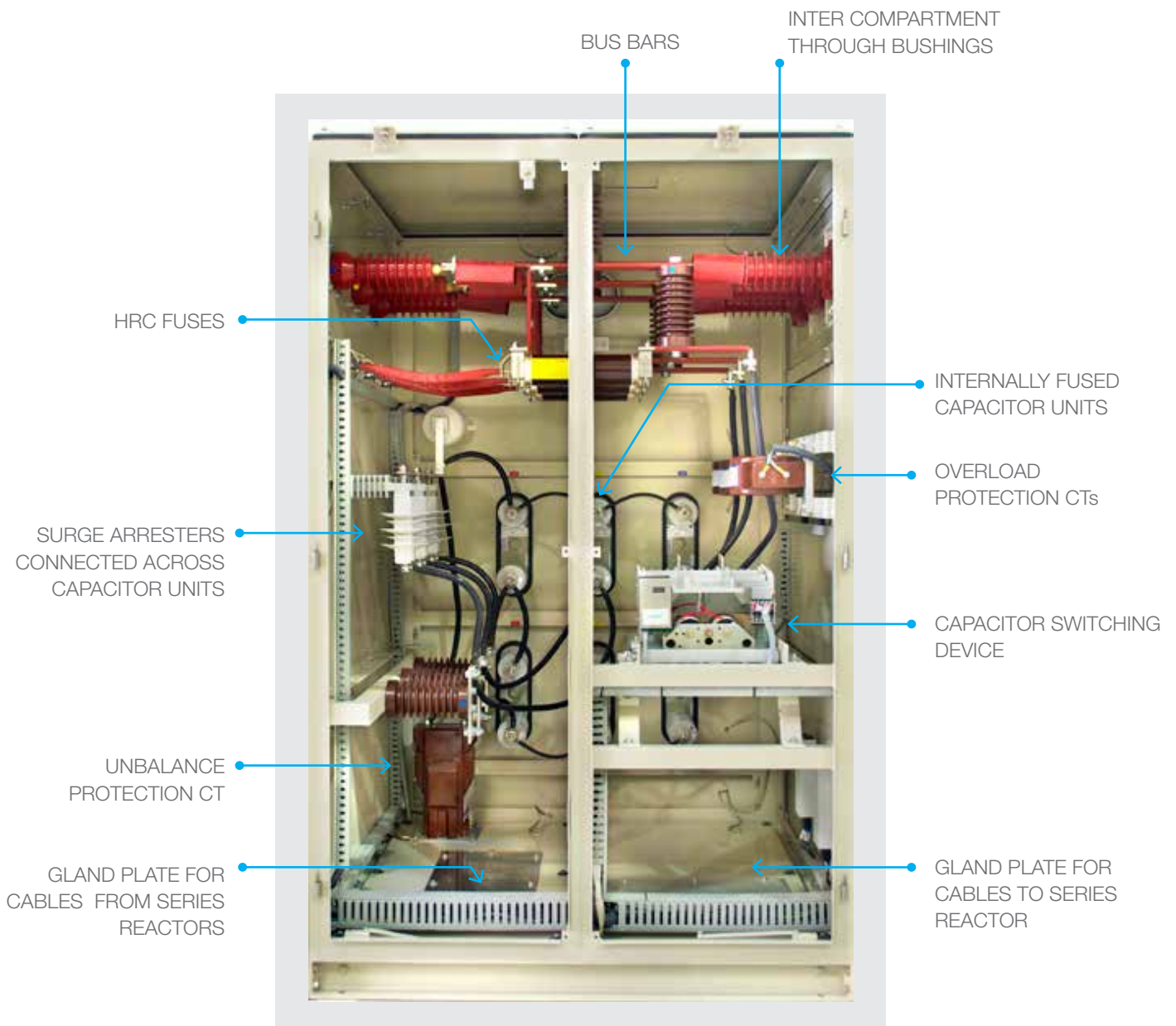
These designs are intended for outdoor installation of capacitor bank solutions and are well suitable for multistage configuration. Due to the advantage of natural cooling these can be installed outside the substation building saving considerable cost. The factory assembled capacitor banks in metal enclosures of high ingress protection results in less installation cost and maintenance.

The outdoor metal enclosed capacitor banks are equipped with air core series reactors which can be of detuning or

inrush current limiting type. Detuning reactors are installed outside the metal enclosures and can be provided with non-metallic housing for wild life protection and aesthetic.

Control, alarm and protection functions are provided by well engineered indoor panel of floor standing or wall mounted type.





Outdoor metal enclosed capacitor banks with air core series reactors

As installed

Outdoor metal enclosed capacitor banks can be installed in various conditions depending on layout and location of substation. Below are some of the typical installation cases

- ▶ On ground with chain fence for operational safety
- ▶ On roof top for space saving in compact substations
- ▶ With reactors in FRP enclosures generally preferred in residential areas for aesthetic

METAL ENCLOSED CAPACITOR BANK

3NOS AIR CORE SERIES REACTORS IN FRP ENCLOSURE



4nos. outdoor metal enclosed 12kV, 6MVAR @ 11kV, Multi stage switched, capacitor banks with air core series reactors at 33kV/11kV substation.

4nos. outdoor metal enclosed 24kV, 12MVar @ 22kV, multi stage switched, capacitor banks with air core series reactors on roof of 132kV/22kV substation



VERTICALLY STACKED 3 PHASE
AIR CORE SERIES REACTOR

METAL ENCLOSED 4 STAGE
SWITCHED CAPACITOR BANK

Indoor metal enclosed capacitor banks with iron core series reactors

General specification

These designs are intended for indoor installation of capacitor bank solutions and are well suitable for multistage configuration. Being in indoor environment forced cooling is required which is mostly provided by building air conditioning. The iron core reactors can be installed inside or outside the capacitor bank enclosure. The factory assembled capacitor banks in metal enclosures results in less installation cost and maintenance.

The indoor metal enclosed capacitor banks are equipped with iron core series reactors for detuning requirements. In case of inrush current limiting requirements reactors are of air core design.

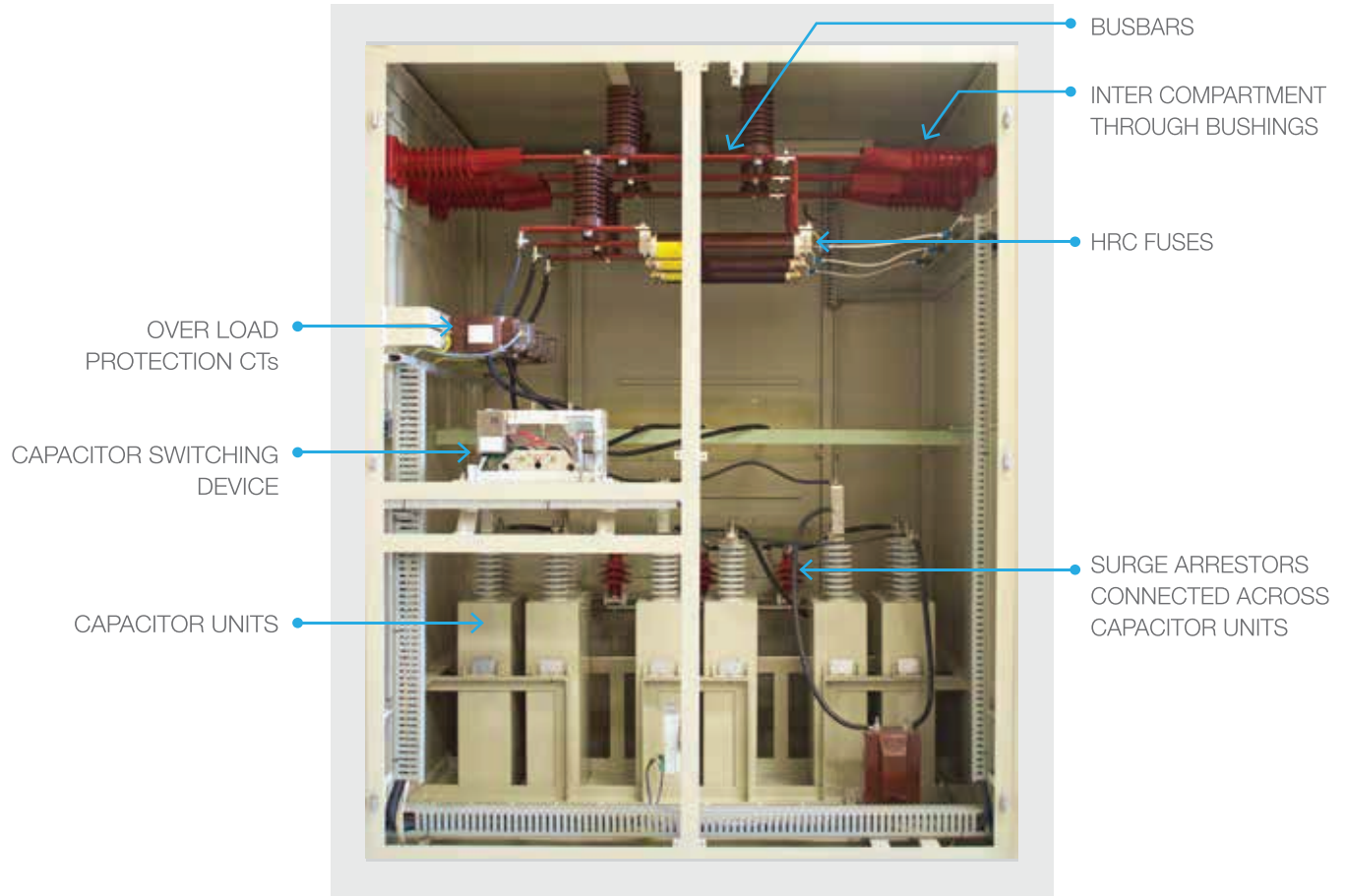
Control, alarm and protection functions are provided by well engineered indoor panel of floor standing or wall mounted type which is installed in separate location for operational safety.

CONTROL &
PROTECTION
PANEL



INCOMER FOR
CABLE TERMINATION

CAPACITOR STAGE 1



Indoor metal enclosed capacitor banks with iron core series reactors

As installed

Indoor metal enclosed capacitor banks can be installed in various conditions depending on layout and location of substation. Below are some of the typical installation cases

- ▶ In separate room for operational safety. In this case control and protection panel is installed outside the room
- ▶ In bays with chain fence separating the capacitor banks.



Indoor 12kV, 6MVar @ 11kV multistage switched capacitor bank with iron core series reactor at 33kV/11kV substation

Disruptive text about this installation, to come here



Control and protection panels for capacitor banks

All Power Economy capacitor banks of metal enclosed designs are supplied with specifically engineered control and protection panel with dedicated automatic power factor or voltage controller. Sophisticated control, alarm and protection schemes can be provided to meet requirements of client specifications. Control and protection panels can be of floor or wall mounted type.

Multistage capacitor banks are protected by dedicated and exclusively designed protection relay which takes care of harmonic currents flowing into capacitors using true rms based over-current protections and neutral unbalance protection with natural unbalance compensation. Control and protections panels can also be installed with communication equipment based on substation requirements.





Outdoor and Indoor capacitor banks of open execution type

General specification

These designs are intended for both outdoor and indoor installation with switching by substation switchgears. Capacitor banks are made of series and parallel connected capacitor units on insulated/floating frames. The single phase capacitor bank and reactor can either be installed as vertical stack or in side by side arrangement.

Open execution type capacitor banks are well suitable for bulk compensation at higher voltage levels including EHV

system and can be designed to suit client specifications. These can be of inrush current limiting or detuned design. Multistage concept in open execution is also possible with dedicated switching module of outdoor installation type.

Control, alarm and protection functions are provided by well engineered indoor panel of floor standing or wall mounted type which is installed in separate location for operational safety.



Outdoor 36kV, 20MVar @ 33kV capacitor bank with air core series reactors ready for factory acceptance testing



Outdoor 36kV, 20MVar @ 33kV capacitor bank with air core series reactors ready for factory acceptance testing



Outdoor 13.8kV, 7MVar capacitor bank with air core series reactors

Outdoor and Indoor capacitor banks of open execution type

As installed

Open execution capacitor banks can be installed in various conditions depending on layout and location of substation. Below are some of the typical installation cases

- ▶ In separate room for operational safety. In this case control and protection panel is installed outside the room
- ▶ In bays with chain fence separating the capacitor banks
- ▶ As individual installation with chain fence for operational safety



8nos. Indoor 36kV, 5MVAR @ 33kV, capacitor banks with air core series reactors in 220kV/33kV substation.



Outdoor 36kV, 20MVar @ 33 kV, capacitor bank with air core series reactors in 132kV/33kV substation

Outdoor capacitor banks for rural electricity distribution

General specification

These designs are outdoor installation and are well suitable for small to medium capacity reactive power compensation for rural distribution lines. These simpler and cost effective designs can be of either pole mounted or pad mounted type.

The pole mounted solutions are factory assembled and can be installed on single or H pole of wood, concrete or steel material and are associated with drop-

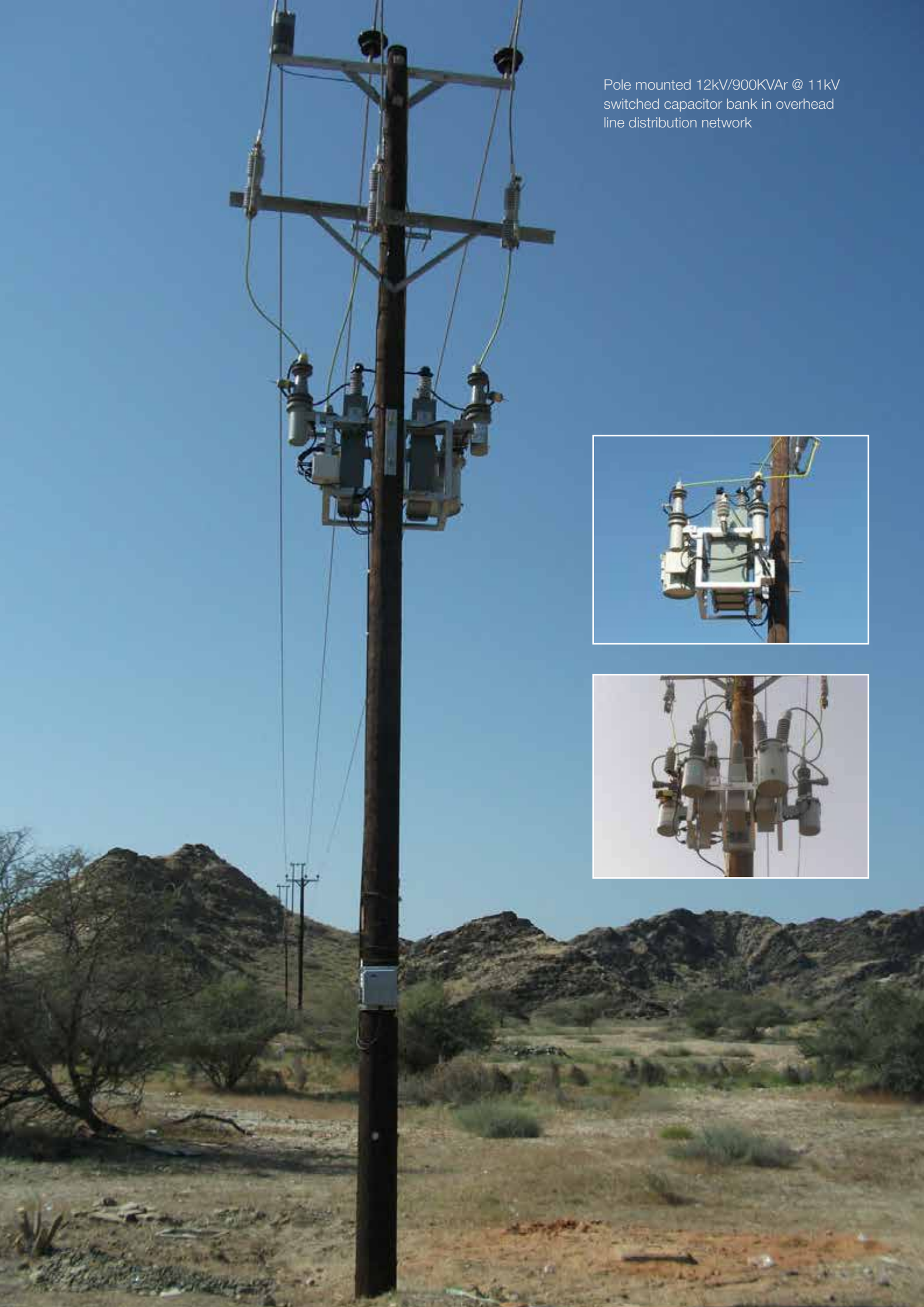
out fuses and automatic power factor controller.

Pad mounted capacitor banks can also be of medium capacity and are factory assembled. Being on ground they are easy to access for installation, operation and maintenance purpose. Also for higher ratings they can be provided with dedicated over-current and neutral unbalance protections along with remote communication equipment.



Padmounted 12kV, 0.75MVAR @ 11kV, switched capacitor bank in overhead line distribution network

Pole mounted 12kV/900KVA @ 11kV
switched capacitor bank in overhead
line distribution network



Air core reactors

Air core reactors are suitable for indoor/outdoor installation. Reactor coils are braced between top and bottom aluminium spiders. These reactors are mounted on porcelain post insulators. These are single phase units, which can be arranged in stacked or trefoil layout to make 3-phase reactors.

Inrush current limiting type reactors are also air core type with installation on epoxy resin cast/Porcelain insulators and are suitable for indoor/outdoor installation.

Applications of air core reactors

- ▶ Detuning reactors
- ▶ Neutral grounding reactors
- ▶ Inrush current limiting reactors
- ▶ Low capacity shunt reactors

Technical particulars	
Rated Voltage	3.6kV to 36kV
Rated frequency	50Hz/60Hz
Power frequency withstand voltage	20kVrms up to 95kVrms
Lightning Impulse withstand voltage	60kV peak to 250kV peak
Design ambient temperature	35°C to 55°C
Conductor	Copper/Aluminium
Insulation	Polyester/Fibre Glass
Encapsulation	Epoxy resin/Polyurethane



Detuning reactors



Inrush current limiting reactors



Iron core reactors

Iron core reactors can be installed on floor or inside the enclosure of capacitor bank. High grade magnetic material laminates are used to prepare core material, which is then assembled in 3-phase magnetic circuit. Prewound single phase poles are then installed to make 3-phase reactors. Polyester film coated copper/Aluminium conductors are used to prepare winding. After coil testing, these are finished with varnish and painted before final tests.

All reactor designs are verified by type testing impulse voltage withstand and temperature rise. All manufactured reactors are subject to routine tests as required by applicable IEC standards.

Technical particulars	
Rated Voltage	3.6kV to 12kV
Rated frequency	50Hz/60Hz
Power frequency withstand voltage	20kVrms upto 38kVrms
Lightning Impulse withstand voltage	60kV peak to 95kV peak
Design ambient temperature	35°C to 40°C
Conductor	Copper
Insulation	Polyester/Fibre Glass
Encapsulation	Epoxy resin/Polyurethane

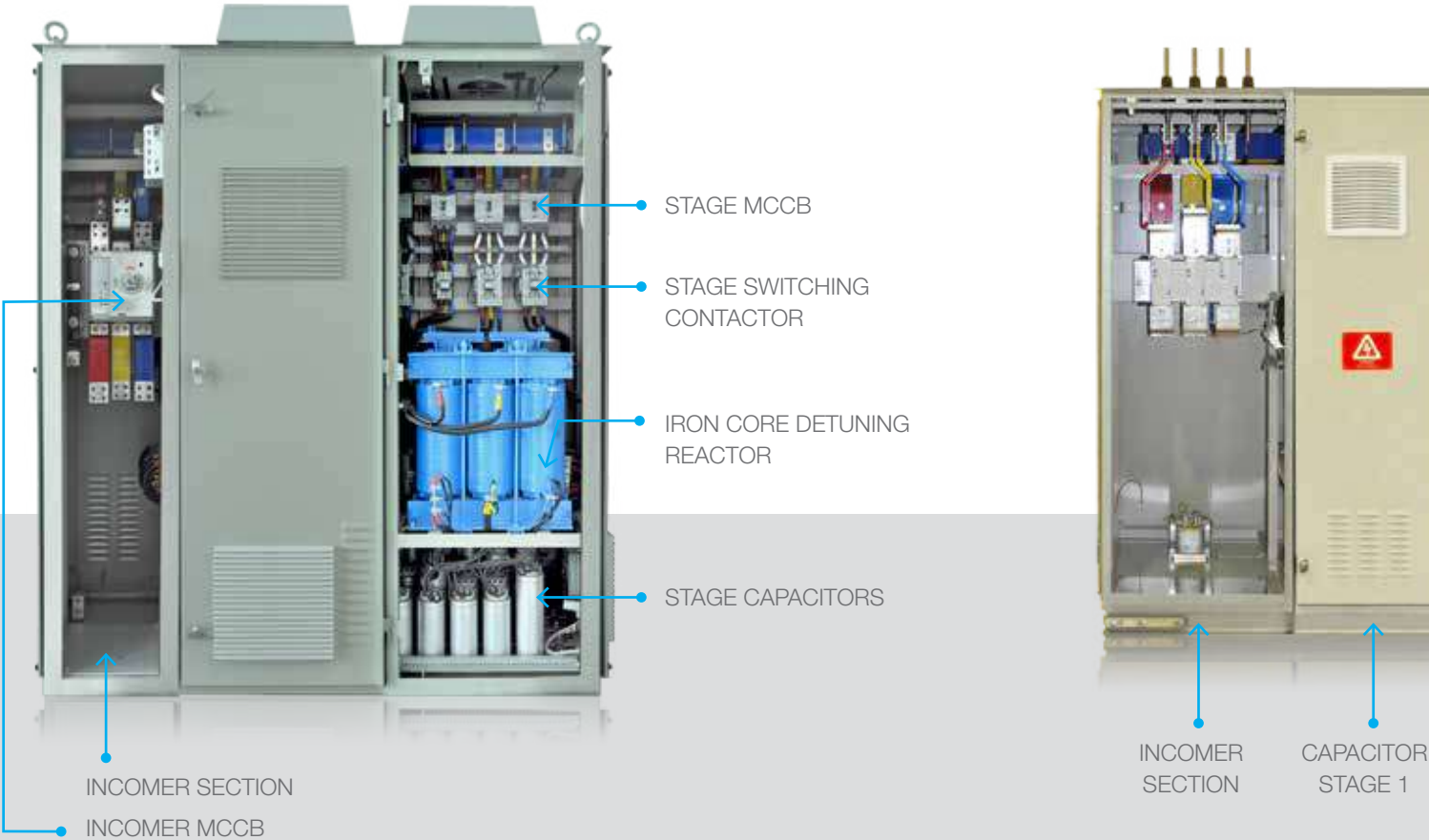


Indoor metal enclosed automatic LV capacitor bank

These designs are of indoor installation and are well suitable for small to medium capacity reactive power compensation for low voltage distribution substations. Steady state reactive power compensation solutions are provided with contactor for stage switching and also MCCB is used for short circuit and over-current protection. Thyristor switching is used for dynamic reactive power compensation type capacitor banks.

Both the above designs can be of multiple stages with detuning series reactors of iron core design. Incoming to the capacitor bank can be either cable or busduct. MCCB and Isolator are provided on incoming supply for protection and isolation purpose.

Low voltage contactor switched 500kVAr, 6 stage capacitor bank with iron core detuning reactors





- FUSE
- THYRISTOR SWITCH
- IRON CORE DETUNING REACTOR
- STAGE CAPACITORS

Low voltage thyristor switched 1500kVAr, 14 stage capacitor bank with iron core detuning reactors



- ↑ CAPACITOR STAGE 2
- ↑ CAPACITOR STAGE 3 & 4
- ↑ CAPACITOR STAGE 5 & 6
- ↑ CAPACITOR STAGE 7 & 8
- ↑ CAPACITOR STAGE 9 & 10
- ↑ CAPACITOR STAGE 11 & 12
- ↑ CAPACITOR STAGE 13 & 14

Site Support

Power Economy offers a broad range of field support services. As a customer you may have diverse needs on site service, based on the type and size of your electrical installation. These are well addressed by Power Economy's SITE SUPPORT team.

We have a team of committed and competent engineers who can offer quality service and value through proper analysis and requirement within your framework.

The host of services offered are well tailored to customer needs and their equipment lifecycle phase.

- ▶ 24/7 Support
- ▶ Corrective & Preventive Maintenance outsourcing
- ▶ Site Appraisal
- ▶ Spares Management
- ▶ Training
- ▶ Telephonic Support
- ▶ Site inspections
- ▶ Power quality and verification services with harmonic analysis and recommendation for improvement
- ▶ Upgradation, revamping, retrofitting and modification of the existing system.
- ▶ Extensions and adaptations to the existing system
- ▶ Replacements
- ▶ Service Agreements to ensure uninterrupted operations
- ▶ Trainings programs customized to your needs
- ▶ Reduce operation costs by outsourcing corrective and preventive maintenance to us
- ▶ System improvement and equipment performance study
- ▶ Extension, Upgrades and Retrofits
- ▶ Site installation and Testing & Commissioning
- ▶ Emergency on-site repairs





Gallery



Outdoor metal enclosed, 6MVAR @ 11kV detuned capacitor bank for ADPC, UAE



Outdoor metal enclosed, 6MVAR @ 11kV detuned capacitor bank for ADDC, UAE



Indoor metal enclosed, 1500kVAr, Thyristor switched, LV detuned capacitor bank for Sohar Steel, Oman



Outdoor metal enclosed, 5MVar @ 11kV detuned capacitor bank for MZEC, Oman



Outdoor 36kV air core detuning reactors for SEWA, UAE



Outdoor metal enclosed, 20MVar @ 33kV detuned capacitor bank for OETC, Oman



Pole mounted, 600kVAr @ 11kV capacitor bank for AADC, UAE



Outdoor metal enclosed, 20MVAR @ 33kV detuned capacitor bank for SEWA, UAE



Outdoor metal enclosed, 6MVAR @ 11kV detuned capacitor bank for ADWEA, UAE



Open execution, 7MVAR @ 13.8kV detuned capacitor bank for SEC, KSA



Outdoor metal enclosed, 12MVAR @ 11kV detuned capacitor bank for ADWEA, UAE

Customers



Utilities



Abu Dhabi Water & Electricity Authority (ADWEA), UAE



Abu Dhabi Distribution Co (ADDC), UAE



Al-ain Distribution Co (AADCO), UAE



Abu Dhabi Transmission & despatch Company (TRANSCO), UAE



Sharjah Electricity & Water Authority (SEWA), UAE



Federal Electricity & Water Authority (FEWA), UAE



Muscat Electricity and Distribution Co (MEDCO), Oman



Mazoon Electricity and Distribution Co, Oman



Majan Electricity and Distribution Co, Oman



Oman Electricity Transmission Company, (OETC), Oman



Rural areas Electricity Company (RAECO), Oman



Dhofar Power Company (DPC), Oman



Kahramaa, Qatar



Saudi electricity Co, K.S.A.



National Electricity Corporation, Sudan



Abu Dhabi Ports (ADPC), UAE



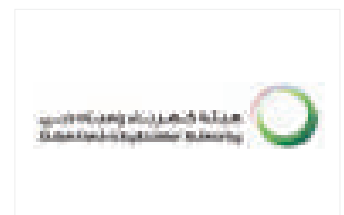
Kenya Power and Lighting Company, Kenya



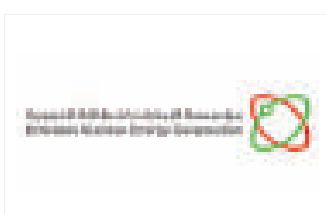
Kenya Electricity Transmission Co.Ltd. (KETRACO), Kenya



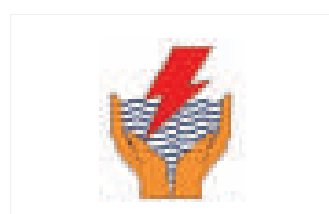
Ministry of Electricity, IRAQ



Dubai Electricity & Water Authority (DEWA), Dubai



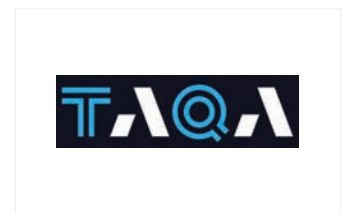
Emirates Nuclear Energy Corporation (ENEC), UAE



Ministry of Electricity and Water (MEW), Kuwait



Tenaga Nasional Berhad



هيئة كهرباء ومياه دبي
Dubai Electricity & Water Authority

Industries

- ▶ Petro chemical units
- ▶ Cement production units
- ▶ Aluminium production units
- ▶ Sugar manufacturers
- ▶ Steel melt shops & rolling mills
- ▶ District Cooling
- ▶ Water pumping stations

OIL & GAS



Abu Dhabi Company for onshore Oil Operation (ADCO), Abu Dhabi



GASCO, Abu Dhabi



NPCC, Abu Dhabi



Occidental Petroleum Corporation



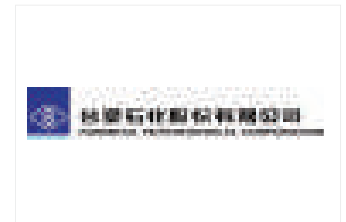
Petroleum Development, Oman



Oman Oil refineries & Petroleum Industries (ORPIC), Oman



Egyptian Petrochemicals co., Egypt



Formosa Petrochemicals Corporation, Taiwan



Abu Dhabi National Oil Company (ADNOC), Abu Dhabi



Abu Dhabi Oil Refining Company (Takreer), UAE

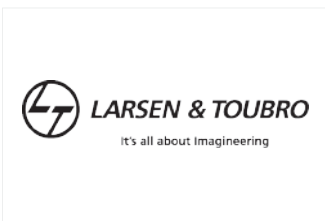


Borouge, Abu Dhabi



Kuwait oil company, Kuwait

Contractors



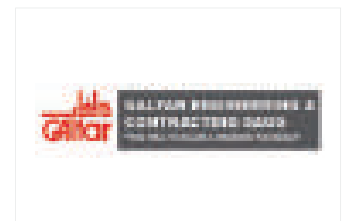
Larsen & Toubro (L&T)



ETA GROUP



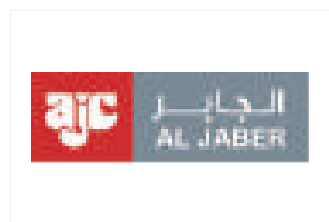
Bahwan Engineering Group



Galfar Engineering & Contracting SAOG



Ghantoot Group



Aljaber Group



National Contracting Company (NCC)



Siemens



ABB



Alstom



Inabensa



Hyundai

Commercial

- ▶ Hotel complexes
- ▶ Office complexes
- ▶ Residential complexes
- ▶ Shopping malls



Our Offices

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Abu Dhabi, UAE

POWER ECONOMY OMAN L.L.C.
Muscat, Sultanate of Oman

POWER ECONOMY USA LLC
Allentown, USA

PEI MALAYSIA SDN.BHD
Negeri Sembilan, Malaysia

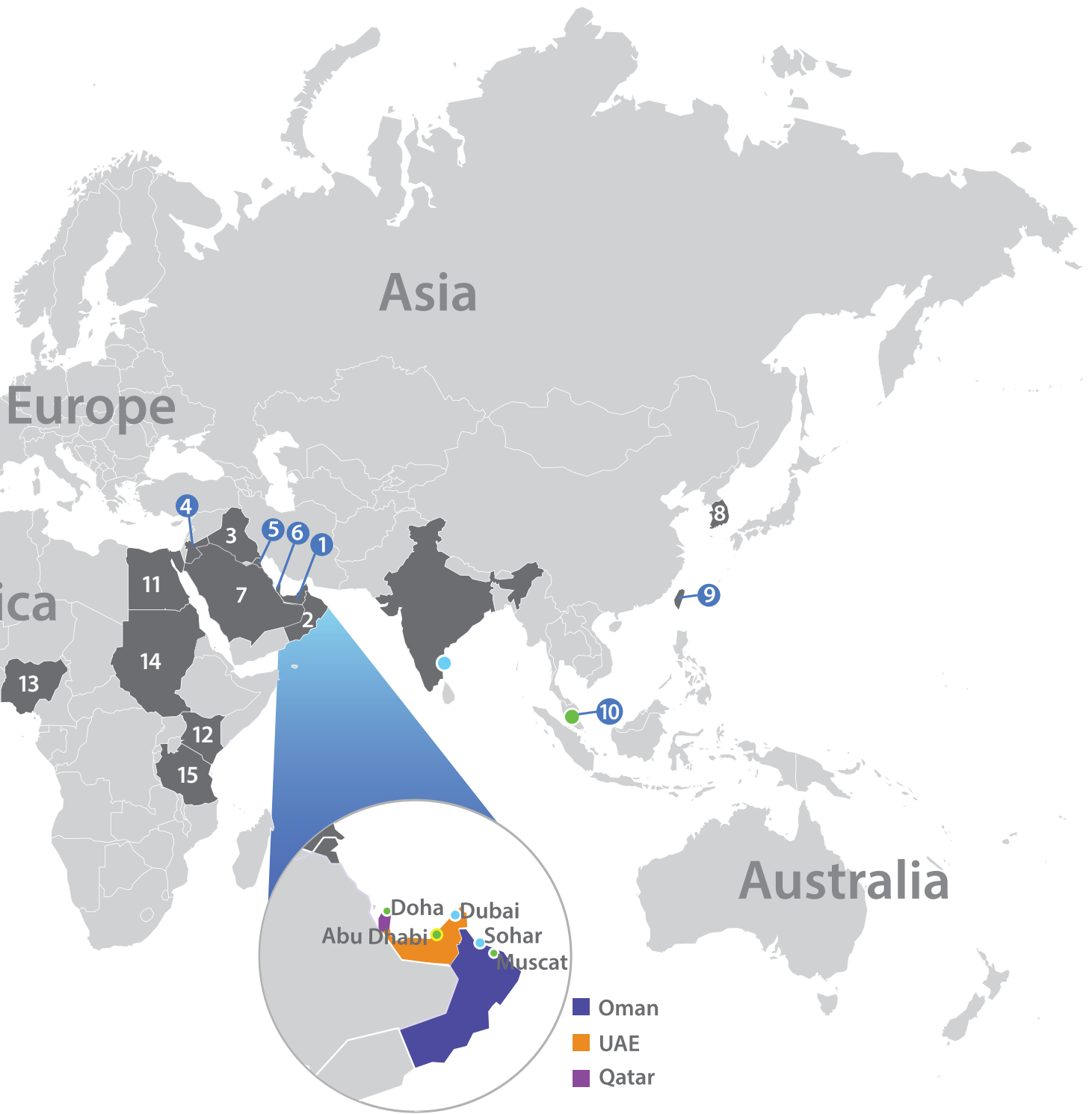
Our Group Companies

UAE
MUSANDAM ELECTRICAL EQUIPMENT CO. L.L.C.
Abu Dhabi

ELECTRICAL SUPPLIES EST.
Abu Dhabi

Sultanate of Oman
MAJAN SWITCHGEAR CO. L.L.C.
Sohar

AL MURAD INTERNATIONAL CO. L.L.C.
Muscat



● Our Presence

USA
UNITED ELECTRIC SYSTEMS INC.
 Allentown

India
OHM ENERGY MANAGEMENT SYSTEM PVT. LTD.
 Chennai

DEUTSCHLAND TRANSFORMERS PVT. LTD.
 Chennai

POWER ECONOMY ELECTRICAL ENGG. PVT. LTD.
 Chennai

Asia	Africa	North America
1. UAE	11. Egypt	16. USA
2. Oman	12. Kenya	
3. Iraq	13. Nigeria	South America
4. Jordan	14. Sudan	17. Suriname
5. Kuwait	15. Tanzania	
6. Qatar		
7. Saudi Arabia		
8. South Korea		
9. Taiwan		
10. Malaysia		



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