



INTERNATIONAL

Operation & Maintenance

Energy Engineering • It's in our DNA





The mission of ESB International is to unlock value for energy utilities and developers right around the globe.

Welcome

ESB International adopts a tailored approach to the delivery of services, geared for optimal performance over the lifetime of the asset. We customise our range of solutions to the needs of our customers which includes project support, mobilisation, technology and knowledge transfer.

ESB International, which is wholly owned by Electricity Supply Board (ESB), is a leading engineering consultancy firm to the global utility sector. We are headquartered in Dublin, Ireland, with a long established presence in the Middle East with offices in Bahrain, Oman, Saudi Arabia and United Arab Emirates. ESB International also have operations in Europe, Africa and South East Asia. We have a fully-integrated structure with a team of 7,500+ experts.

We work in partnership with asset owners to deliver large-scale, capital intensive projects, using a proprietary project delivery methodology to minimise project risk and maximise investor returns.

In all our markets, our clients face strategic challenges that affect millions of people – and our solutions help transform economies, societies, and the lives of individuals and communities.

Our success is built solidly on our experience in delivering electricity to our own country, resulting in a social and economic revolution over many decades.

ESB has brought electricity to Ireland's major towns and cities; a Rural Electrification Scheme brought the transformative power of electricity to even the most remote corners of the country.

We have drawn on this experience in over 120 countries around the world, offering not just technical expertise, but also the leadership and personal commitment to succeed in some of the most demanding economies and geographical regions around the globe.

We would be delighted to share our expertise in Operation & Maintenance with you, and we assure you of our unstinting support throughout whatever journey you may now be embarking on.



— A case study to judge us on



Philippines Operations & Maintenance Advisory for Energy Development Corporation

ESB International entered into an agreement with the Philippines geothermal power producer, Energy Development Corporation (EDC), to provide Operations and Maintenance (O&M) Advisory Services. Following an initial assessment period, we delivered a targeted program of key process improvements and updating of strategic business applications to meet the client's needs across the utility.

Client Name

Energy Development Corporation

Start Date – End Date

October 2018 - Ongoing

Background

Energy Development Corporation (EDC) is the largest vertically integrated geothermal company in the Philippines and operates 1,200 MW of geothermal generation across 11 facilities in four widely dispersed geographic locations. In 2018, ESB International was contracted by EDC to provide Operations & Maintenance (O&M) Advisory Services to support their journey as the company moved through a phase of reinvestment and reorganisation.

ESB International conducted an initial assessment and review to identify gaps and priorities. The client agreed to a targeted program to deliver key O&M process Re-engineering and updating of strategic business applications across the utility.

What services we provide

Safety Management

- ESB International's Safety Rules and Safety Document Management System inc. Competency Management.

Process Safety

- Supporting Implementation of Alarm Management to ISA 18.2.
- Standardised Operator Shift Logs
- ATEX reviews and Explosion Protection Documents.
- COSHH audit.
- Standardised drawings, equipment registers, and plant labelling

O&M Process Re-engineering

- Lifetime Asset Management Process Implementation.
- Work Management Systems, (WMS), and process training.

What we achieved

Digital Transformation Projects delivered on time, on budget and in scope

Best practice Safe Systems of Works and the Safety Rules embedded

Re-engineered multiple O&M processes to best industry standards

- WMS KPIs Development including KPI Dashboard & Reporting.
- Supporting engineering standards and procedures development.
- ISO 55001-ready Asset Management System.
- O&M methodology for new power plant takeover

Utility-wide Digital Transformation

- System selection to best match legacy systems and new processes
- IT infrastructure upgrades, data migration, system integration and rollout.
- Software systems included IBM Maximo, Nisoft e3, SAP PO, SAP, Coupa and Honeywell Forge Alarm Management Software



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AXPO Italia / ASPI Review of Long Term Service Agreement (LTSA)

Client Name AXPO Italia
Start Date – End Date 2019 - 2020

Background

ESB International were contracted with AXPO Italia for consultancy services to review their current LTSA maintenance Agreement.

Phase One consisted of a review and assessment of existing LTSA agreement, including site survey. Phase Two consisted of developing specification and RFP for a new LTSA, including review of bids from vendors, assistance with final negotiation, an in depth review of Operations and Maintenance organisation and assessment of re-structuring, as required.

The project's initial phase involved detailed workshop sessions with the AXPO at its base in Genoa. This established a clear understanding for both client and Consultant of the deliverables of the project.

The project entailed engagement between ESB International and ESB Specialist Contract Services on the latest approach and market assessment of LTSA contractual matters, to offer advice and assistance to the client.

The services we provided

High level review of Operations & Maintenance organisation.

Initial review and assessment of existing contract (GTF).

Site visits to client power plants to validate documentary evidence provided

Assessment and comparison of new LTSA options.

Full RFQ – including identification of suitable vendors, review of proposals and presentation of new contract to preferred vendor.

Delivery of initial assessment and options report.

Conference calls with Client to clarify options (travel curtailed due to Covid 19 restrictions)

Modification of existing contract to reflect required new criteria.

Advice and negotiation assistance to Client, to finalise new contract.

In depth review and assessment of O&M organisation to reflect change requirements arising from new LTSA contract commitments.

Assessment and mentoring of organisational changes through initial implementation stages.

Delivery of overall final report.



— A case study to judge us on



Delimara 4 Operation & Maintenance Agreement

Delimara 4 is the first and only independently owned power station in Malta and is an LNG-to-Power project designed to reduce dependence on diesel for power generation on the island. The plant's owner, Electrogas Malta, is an equal parts consortium comprising a local holding company, Siemens and SOCAR Trading. ESB International's role was to bring decades of experience to the project and complete the operation and maintenance of the plant on behalf of the owner and, in the process, embed the processes and procedures developed through experience in a wide variety of international projects.

| | |
|------------------------|--------------------------|
| Client Name | ElectroGas Malta (EGM) |
| Start Date – End Date | March 2016 - August 2022 |
| Duration of Assignment | 6.5 years |

Background

In 2016 ESB International entered an Operations and Maintenance (O&M) contract with Electrogas Malta (EGM) to operate and maintain the 215 MW Delimara 4 plant over a 6.5-year term. This comprised of one-year of mobilisation and a half-year operation in open cycle followed by five years of combined cycle operation. The power plant is a 215 MW, 3:3:1 configuration, with 3 x 50 MW Siemens SGT-800 GTs, 3 x HRSG and 1 x 67 MW Siemens SST900.

The OEM and EPC contractor for the power plant is Siemens, which also holds the LTSA for the power plant. It is a bundled project, starting from the Fuel Supply Unit (a floating storage vessel), providing storage and supply of LNG for the project. Regasification is completed onshore with the re-gasified LNG and then fed to the power plant. ESB International was contracted for the O&M of the power plant, with other experienced operators managing the remainder of the project.

What we achieved

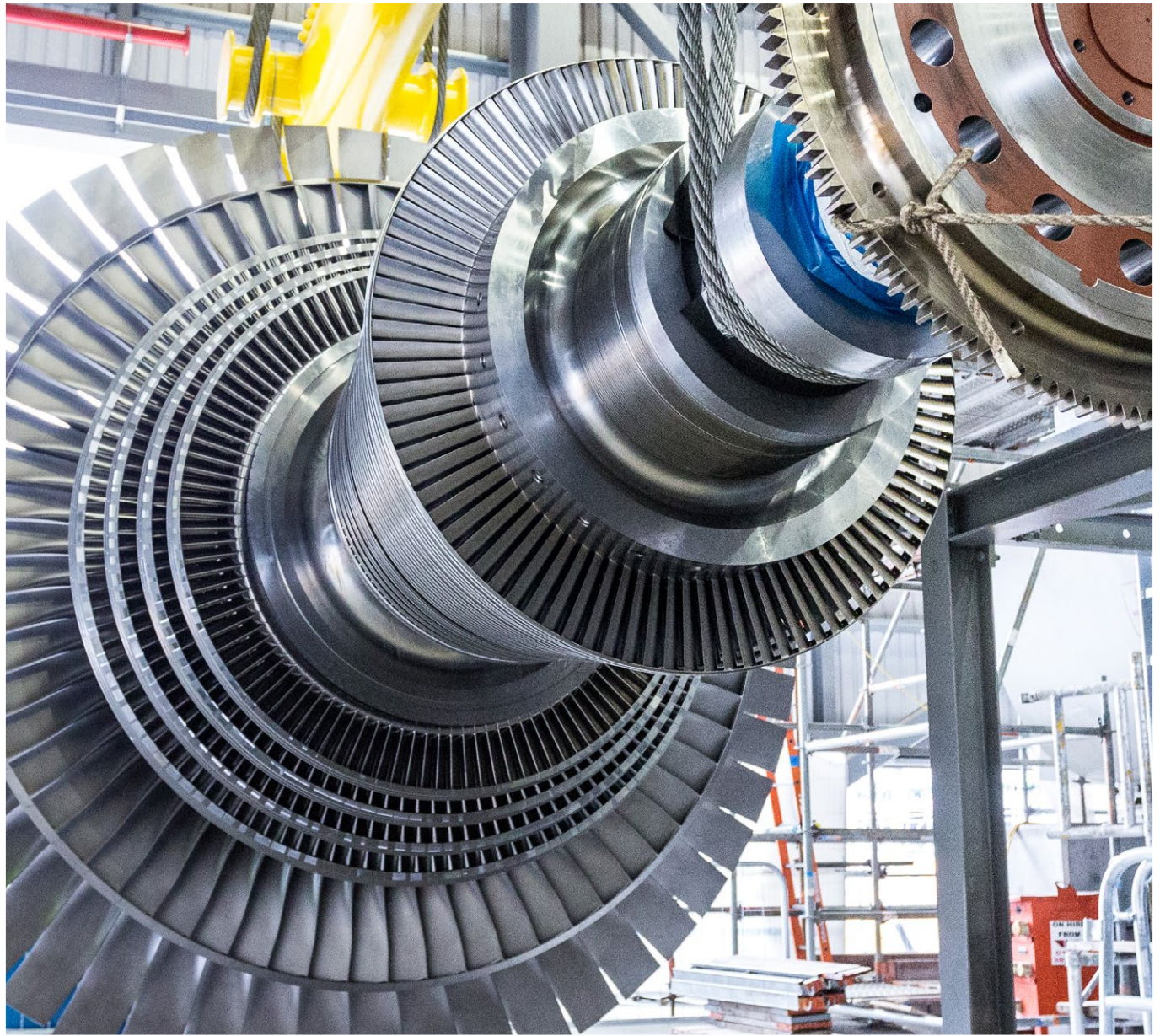
On time take-over from EPC Contractor

ISO accreditation within 2 years of take-over

Operators' availability figures > 99% over operating period

What services we provide

- Selection, recruitment and training of the power plant staff.
- Mobilisation of Plant Stores & Maintenance facilities
- Developed and implemented maintenance strategy and maintenance schedules.
- Implemented Business Management System including technical standards & guidelines, O&M procedures and standing instructions ensuring safe and efficient operation
- Implemented best industry practice safety control and permit to work systems.
- Implemented Business Critical Systems for Enterprise Asset Management & Safety Document Management System
- Established work management, technical records, stores management, personnel, financial, environmental, safety and general administration systems in accordance with Good Industry Practice.
- Implemented environmental management programme meeting the owner's requirements and regulatory compliance.
- For the Operation phase, ESB International was responsible for:
 - Operation and maintenance of Delimara 4
 - Performing the Routine, Planned and Unplanned Maintenance of Delimara 4
 - Managing the LTSA with the LTSA Contractor on behalf of the Owner
 - Achieving and maintaining ISO9001 (Quality), ISO14001 (Environmental), ISO45001 (Safety) certification
 - Preparing ISO55000 (Asset Management) ready for certification.



— A case study to judge us on



Consultancy Service for Renewal of Long Term Services Agreement (LTSA)

Client Name

Sohar Aluminium

Start Date – End Date

March 2018 - 2022

Background

Following a competitive tender process, ESB International was awarded a contract by Sohar Aluminium for consultancy services in the renewal of their current LTSA maintenance.

The service considered maintenance requirements for Sohar Aluminium Gas and Steam Turbines and associated generators in their existing power plant, incorporating potential Life Time Extension arrangements and possible machinery hardware upgrades.

The project entailed engagement between ESB International and ESB major contract services on the latest approach and market assessment of LTSA contractual matters to offer advice and assistance to the client.

The services we provided

Initial review and assessment of existing LTSA contract

Assessment and comparison of new LTSA options.

Extensive conference calls with Client to clarify options (travel curtailed due to Covid 19 restrictions)

Delivery of initial assessment and options report.

Delivery of full suite of extensive contract documents to reflect required new criteria

Provision of Instructions to Tenderers (ITT)

Identification of potential new suitable vendors list

Development of PQQ (pre-qualification questionnaire)

Evaluation of Tenders received

Advice and negotiation assistance to Client to finalise new contract.

Delivery of overall final report



Further operation & maintenance experience

ESB International has extensive O&M experience both in Ireland and abroad.



CARRINGTON POWER 860 MW COMBINED CYCLE GAS TURBINE (CCGT)

United Kingdom

Carrington Power, near Manchester, is ESB's latest CCGT development in the United Kingdom and is one of the most efficient power stations in the UK. ESB International was responsible for the planning, designing, engineering, construction and commissioning of the Carrington CCGT power plant project. The day to day operations and maintenance team are responsible for all management activities in the power plant.

AGHADA 435 MW CCGT

Ireland

During design and construction, ESB International provided the engineering services for development, construction and supervision (Owner's Engineer). The plant is operated by ESB with an Operation and Maintenance team of 37 staff.

YENI ELEKTRIK 865 MW CCGT

Turkey

Unit International and ESB International established a 50/50 partnership with Unit International and ESB International, called UNES, for the Yeni Elektrik project. UNES and ESB International provided O&M services for Yeni Elektrik's 865 MW CCGT in Gebze, Kocaeli, with 38 O&M personnel between 2013 - 2019.

VOLTA RIVER AUTHORITY (VRA) 755 MW CCGT

Ghana

ESB International provided O&M support and advisory services to VRA for the management of generation assets, capacity development and O&M support at the Takoradi and Tema Plants. The project was delivered over a three year period from 2014 - 2017 through a core ESB International team based in Ghana, who were supported, as appropriate, by specialist support services provided from ESB International headquarters in Dublin. The contract scope was based on the co-created methodology developed by ESB International / VRA in an effort to progress VRA to international best practice.

ROUSCH 412 MW CCGT PUNJAB

Pakistan

ESB International operated and maintained the Rousch plant for over 20 years up to 2017. Rousch is a 412 MW combined cycle plant using Siemens F-class technology. Initially, the plant, which uses Siemens V94.2 gas turbines, was fuelled by residual crude oil transported to the plant from oil refineries in the south. A gas-fuel conversion project was undertaken to convert the plant to burn natural gas. The plant is owned by a consortium of companies, of which Descon Engineering is the majority shareholder.

ESB International further supported the plant through a Technical Services Agreement (TSA) in 2018, whereby experienced management and technical specialists assisted during the transition to a new plant management team.

DELIMARA 4 215 MW CCGT

Malta

ESB International entered into an O&M contract with Electrogas Malta (EGM) to operate and maintain the 215 MW Delimara 4 plant over a 6.5 year term in 2016, including one year mobilisation and half year operation in Open Cycle. The power plant is a 215 MW, 3:3:1 configuration, with 3 x 50 MW Siemens SGT-800 GTs and 1 x 67 MW Siemens ST.

MONEYPPOINT ESB 915 MW COAL

Ireland

Three units of 305 MW each were put into service at Moneypoint in the west of Ireland in October 1985, July 1986 and April 1987. ESB International provided complete design and construction management services on a multi-contract basis.

ESB has operated the power plant, coal yard, ash handling and deep water jetty since construction, primarily as a base-load plant.

ESB International managed an environmental refit project to reduce NOx and SOx particulate matter over the period 2005 - 2010. A major refurbishment of the DCS Control System was also undertaken at this stage.

EDC O&M ADVISORY SERVICES GEOTHERMAL POWER PLANTS

Philippines

ESB International has advised EDC in the establishment of world class O&M practices, systems and procedures across their fleet of geothermal assets.

This included the development and implementation of an asset management system, internationally recognised power plant safety rules and a new enterprise asset management system.

PORT DICKSON 440 MW OCGT

Malaysia

ESB International had an eight year contract to operate and maintain the 440 MW plant at Port Dickson, the first generation of Independent Power Plants (IPP) in Malaysia. The plant consists of four GE frame 9E gas turbines in simple cycle. ESB International committed to the localisation of all the plant staff in as short a time as possible through a process of continual technology transfer.

CIKARANG 204 MW OCGT / CCGT

Indonesia

PTCL was the first independent power producer in Indonesia. The primary fuel is gas with distillate as a backup fuel. In 1995 PTCL decided to convert to a combined cycle operation and add 6 HRBs and a steam turbine to uprate the output to 310 MW. ESB International managed the power plant and the utility distribution system, and provided commissioning services for the add-on combined cycle, additional combustion turbines and provided site specific Operations and Maintenance manuals.

POOLBEG 470 MW CCGT

Ireland

The ESB owned and operated power plant is located in Dublin and was commissioned in 2001. ESB International provided the engineering services for full life cycle from the project initiation, development, construction supervision (Owner's Engineer) to Operation and Maintenance. The Operation and Maintenance team consists of 37 staff.

AMOREBIETA 755 MW CCGT

Spain

Amorebieta was the first internationally owned power plant (jointly owned by ESB International and Osaka Gas of Japan) to be developed in Spain, with a capacity to supply 30% of the Basque Region's energy requirements. Prior to its sale in 2013, ESB International were responsible for managing the Operations and Maintenance of this 755 MW plant, which uses GE 9FA technology.

COOLKEERAGH 400 MW CCGT

Northern Ireland

ESB owns, operates and maintains the Combined Cycle Gas Turbine plant at Coolkeeragh, the first in the Northern Ireland competitive market. The 400 MW plant uses GE 9FA technology.

CORBY 350 MW CCGT

United Kingdom

Corby power plant was one of the first independent power plants (IPPs) to be constructed in the deregulated UK market and is one of the strongest performing two-shift plants in the UK. The plant uses GE 9E gas turbines and is 100% owned by ESB.

DUBLIN BAY POWER, 420 MW CCGT

Ireland

This plant is owned, operated and maintained by ESB and is one of the first IPPs to be constructed in the deregulated Irish market. The plant uses a single-shaft Alstom GT26 gas turbine in combined cycle.

MANJUNG 2100 MW COAL-FIRED PLANT

Malaysia

ESB International provided O&M services for this coal-fired power plant (comprising of 3 x 700 MW units using Alstom technology) during its first 28 months of operation and provided technical services for a further two years. The plant is owned by a subsidiary of TNB, the Malaysian National Utility.

O&M AUDITS

Malaysia

ESB International completed O&M audits of various power plants in Malaysia since 2011.

These audits covered operation and maintenance practices and procedures, plant performance, management systems and staffing capabilities.

KULIM 220 MW CCGT, KULIM HIGH TECHNOLOGY PARK

Malaysia

ESB International provided full O&M services and project management for the CCGT power plant and distribution system for Kulim Technology Park development for 15 years up to 2014. In addition to operating and maintaining the CCGT power plant and distribution system, ESB International was responsible for all activities associated with managing the utility including, customer billing. From 2014 to 2017, ESB International provided technical support and O&M advisory services to the customer O&M team. The power plant uses GE 6B gas turbines. It is owned by Northern Utility Resources, a Malaysian company.

We should be talking to each other

To discuss your Power Generation needs, please get in touch with ESB International at the contact points below.

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