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# TRANSMISSION & DISTRIBUTION

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LEADING GLOBAL ENGINEERING CONSULTANCY



INTERNATIONAL

Utility to Utility • Power Generation • **Transmission & Distribution** • Strategic Advisory • Specialist Services

THE MISSION OF ESB  
INTERNATIONAL IS TO  
UNLOCK VALUE FOR  
ENERGY UTILITIES AND  
DEVELOPERS RIGHT  
AROUND THE GLOBE.



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# WELCOME

The Transmission & Distribution division of ESB International works in close association with private and public sector clients around the world to deliver reliable, secure and efficient electricity transmission & distribution networks.

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ESB International, which is wholly owned by Electricity Supply Board (ESB), is a leading engineering consultancy firm to the global utility sector. Headquartered in Dublin, Ireland, we employ over 725 staff across operations in Europe, the Middle East, Africa and South East Asia.

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, we are faced with strategic challenges that affect millions of people – and our solutions help to 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 Transmission & Distribution with you, and we assure you of our unstinting support throughout whatever journey you may now be embarking on.

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# WE COULDN'T SAY IT BETTER OURSELVES – WHAT OUR CLIENTS THINK OF US

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## WE LEARN THEN WE LEAD

**The client's challenge: how do we become a sustainable and efficient utility company who aren't dependent on others?**

"When ESB International came to us we didn't not know anything, we really didn't know ANYTHING – but never did we get the impression that they wanted to force things down to us – it was always this is what we normally do but how does your system work? They listen to us, listen to what we need and then we work together."

## THE EXPERTISE WE LEAVE BEHIND IS OUR BIGGEST ACHIEVEMENT

**The client's challenge: how does an existing utility meet international best practice standard?**

"ESB International walk the steps with us while we are working and tell us where we are deficient so that we can improve. We get direct engagement through mentoring, coaching and hands-on on a daily basis."

## A SHARED JOURNEY TOWARDS A COMMON GOAL

**The client's perception**

"We perceive ESB International not like any consultant; they have built the electricity business in our Country so we perceive them as partners with us, people who worked with us during the development of electricity in our Country. ESB International are like one of us, they are like our own employees."



“The work we do for our clients is not just about solving today’s problems – it’s about leaving a genuine legacy for generations to come.”

# ZONING IN ON TRANSMISSION & DISTRIBUTION

ESB International can provide all the engineering and design services necessary to support the development and operation of transmission & distribution networks.



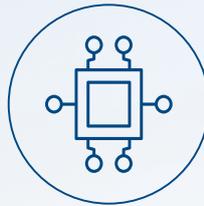
## FEASIBILITY STUDIES AND PLANNING

Our feasibility investigations include cost comparisons, while we also assess the condition of existing overhead lines and substations. Environmental Impact Assessment, Cost and Programme development are also part of our service, along with interconnection arrangements, including HVDC options.



## SITE INVESTIGATIONS AND SURVEYS

We deliver selection, survey and detailed mapping services (using most up-to-date techniques) of routes for overhead lines and underground cables. Our brief can also include substation site evaluation studies, planning permission, analysis and assessment of subsurface conditions – along with topographic and hydrographic surveys.



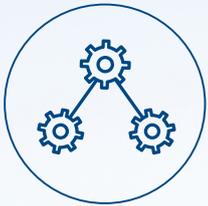
## DESIGN AND SPECIFICATION

We carry out overall design to achieve optimal integration of the various elements of transmission & distribution systems. This can include detailed overhead line design, detailed design of substations, and substation secondary systems. We can take responsibility for HV cable configuration, rating, bonding and earthing, along with telecommunications/ SCADA. We also manage technical specifications for the complete range of equipment used in the transmission & distribution systems.



## SYSTEM STUDIES AND PLANNING

Our services include development of load forecasting models, development of network master plans, use of modern software for steady state and transient stability studies, load flow and contingency analysis, and single and three phase short circuit studies. We can also manage dynamic and transient stability studies, insulation coordination studies, voltage regulation and reactive compensation, plus development of network planning and security standards.



## MATERIAL MANAGEMENT

We manage detailed technical specification and procurement procedures, along with material forecasting and costing, tender evaluation and contract negotiations, plus factory and site acceptance procedures. We also take care of all material storage and handling requirements.



## CONSTRUCTION MANAGEMENT, SUPERVISION AND INSPECTION

Our range of services includes programming and progress monitoring, supervision of construction and installation, approval of all site records, quality control and materials inspections, plus monitoring of safety performance.



## PROTECTION, AUTOMATION, CONTROL AND TELECOMMUNICATIONS

We have extensive experience of Substation Automation Systems, and draw on specialised knowledge of smart meter technology, telecommunication infrastructure and back office software. We also oversee delivery of power system telecommunication systems, new power system control centres and refurbishment/upgrading of existing schemes. Our protection experts provide full protection relay specification, testing, relay configuration and protection relay settings services. We also provide specialised control schemes to enable self-healing networks.



## ASSET MANAGEMENT SERVICES

ESB International Asset Management Services (AMS) group provides a comprehensive range of engineering and management services for maintenance of transmission & distribution networks. These services are based on the adoption of the most up to date technologies and systems complementing many years of practical hands-on experience, and include development of maintenance policies and procedures, condition-based assessment of overhead lines and substation equipment, commissioning of substation primary plant and associated protection systems and schemes, plus maintenance management of HVDC systems. We also cater for the special needs of ageing plant and carry out technical and safety audits, along with provision of organisational structure and staffing solutions. Furthermore, we carry out comprehensive training of maintenance staff and provision of maintenance documentation.



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A CASE STUDY TO JUDGE US ON

# THE MILLENNIUM CHALLENGE ACCOUNT, TANZANIA

As part of this highly strategic project, ESB International was required to provide technical assistance to the respective utilities in Tanzania and Zanzibar and to build capacity within both utilities.

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Start Date – End Date  
**November 2008 – July 2014**

Client Name  
**Millennium Challenge Account,  
Tanzania**

Duration of Assignment  
**5 years**

Name of Senior Staff  
**Project Director - John Ashley  
Team Leader - Johan Swan**

### BACKGROUND

At the time of commencement, the national electricity coverage of Tanzania was approximately 10%, accommodating only 635,000 customers out of a total population of about 40 million. Under the contract, ESB International provided client engineer and construction supervision services in relation to the following key energy project areas:

- > Construction of a new 132 kV submarine cable from mainland Tanzania to the island of Zanzibar;
- > Zanzibar interconnector 132 kV overhead line supply and installation;
- > Substation works – rehabilitation and new-build in six regions of Tanzania, inclusive of the new interconnector substations;
- > Extension of rural distribution networks in seven regions in Tanzania;
- > Feasibility and technical documentation preparation for bid purposes of a 44.8MV hydro powerplant on the Malagarasi River, Western Tanzania; and,
- > A capacity building programme for the two local utilities Tanzanian Electricity Supply Company and Zanzibar Electricity Company.

### THE BENEFITS TO THE LOCAL INFRASTRUCTURE AND ECONOMY

#### ROAD UPGRADING

- > Reduced transportation costs and travel time
- > Increased traffic volume

#### MAFIA ISLAND AIRPORT UPGRADING

- > Increased air passenger traffic

#### ENERGY SECTOR

- > Increased quantity of electricity sold
- > Increased number of power customers
- > Better quality and more reliable power

#### WATER SECTOR

- > Increased number of households and businesses using improved water sources
- > Increased per capita water consumption

# 132 kV

**Submarine cable**  
from mainland Tanzania to the island of Zanzibar

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# HEALTH, SAFETY AND ENVIRONMENT

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## HEALTH

The health and safety of all people associated with our business activities is a key focus for ESB International and this is reflected in the company safety policy which is signed off by the Chief Executive of ESB Group and his Executive Director Team. All senior managers have safety related targets in their respective business areas and must complete a number of safety audits annually.

## SAFETY

The visible leadership is a key part of ESB International's approach to safety. As a wholly owned subsidiary of ESB, ESB International implements the corporate safety policy in full and strives to deliver every project to the highest level safely. A safety steering group in ESB International reviews all projects in detail and implements appropriate actions where required.

At power plant level, ESB International provides and maintains safe and healthy working conditions, equipment and systems of work for its personnel and other persons visiting or carrying out work on its behalf at site. This is achieved by the use of comprehensive rules, procedures and codes of safe practice relating to particular activities.

## ENVIRONMENT

We strive to achieve excellence in all our endeavours and we recognise that our business activities interact with and may have an impact on the environment.

Our objectives are to adhere to the principles set out in the ESB Group Environment Policy in our operational businesses and to deliver best practice solutions to customers while minimising our effects on the environment.

The management and continual improvement of Health, Safety & Environment is a key focus of our Business and an integral part of our approach.

*We place sustainability at the heart of our business, operating to the highest standards in terms of our impact on and care of the environment.*



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# WE SHOULD BE TALKING TO EACH OTHER

To discuss your Transmission & Distribution needs, please get in touch with ESB International at the contact points below.

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