



A specialist energy consultancy

# Training Services

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# Training Courses

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TNEI can tailor the content or length of any course to meet your requirements.

## Training Courses Overview

We have delivered training to a wide range of industry professionals working in various sectors within the energy industry. Training courses are suitable for anyone looking to expand their knowledge and skills.

Our range of standard courses can be tailored to the client's specific requirements. All of TNEI's training courses are delivered by experienced consultants and a certificate of attendance can be provided on request. Courses can be offered either from one of the TNEI offices or at your premises.

TNEI also offer bespoke training courses to meet your specific needs.

Our courses are suitable for:

- Engineers
- Students
- Distribution and transmission companies
- Developers
- Independent connection providers
- Regulators
- Consenting authorities.

## Software Training Courses

### IPSA Software Training – Introductory

Our introductory IPSA course is a hands-on training course with a focus on modelling power system components using the IPSA software package, including an introduction to fault level theory and fault level calculations.

The introductory course covers the following modules:

- Network drawing
- Database creation
- Per-unit calculation
- Performing load flow in IPSA
- Additional features related to load flow such as contingency analysis and automation
- Fault level analysis in IPSA
  - Both balanced and unbalanced faults
  - Break and Peak Make calculation
  - Fault levels at busbars and fault current flows through circuits and transformers
- Power system theory will be also presented briefly where required.

## Python Programming Language Training

Our introductory Python training is a hands-on course to enable delegates to start programming in Python. The course is structured to be a mixture of lectures and practical examples to make Python easy to learn. The course covers the following modules:

- Introduction
- Data types
- Control structures
- Copying and updating variables
- Function, module and class
- File input/output
- How to use Python to interact and run IPSA using API function.

## DlgSILENT PowerFactory Training

We offer introductory and advanced training on DlgSILENT PowerFactory software. The content for each course covers:

### Introductory

- Data entry
- Performing load flow studies
- Performing short-circuit studies
- Advanced data management
- File input/output.

### Advanced

- Power quality and harmonic analysis
- Scripting and automation
- Stability analysis.

## PSS/E Training

We offer introductory and advanced training on PSS/E power system software. The content for each course covers:

### Introductory

- Introduction
- Data entry
- PSS/E load flow
- PSS/E fault level.

### Advanced

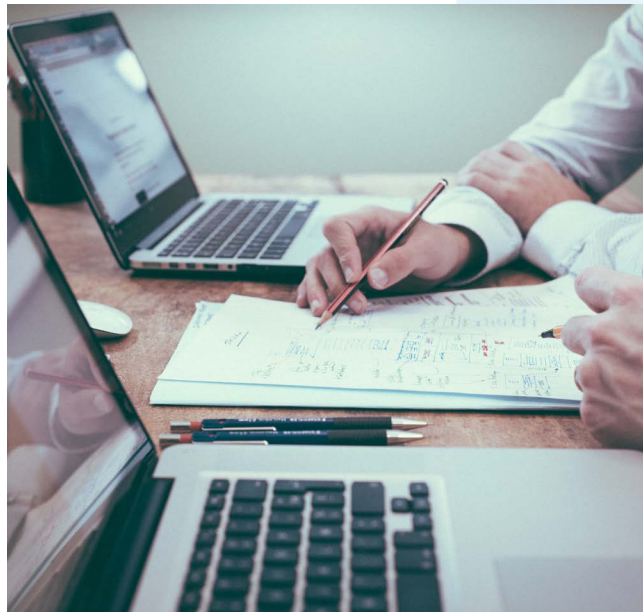
- PSS/E dynamic simulations.

## Grid Connection and Power Systems Training Courses

### Grid Connection Workshop

This training course offers grid connection guidance to renewable power plant developers. The course content covers:

- A basic overview of the principles of grid connection
- An introduction to UK electricity network design



- Specific area guidance
- An update on connection timescales in different parts of the UK
- Opportunity to work through problem sites in an informal workshop.

### Energy Storage Training

This course aims to provide an insight into the connection of energy storage facilities, mainly battery storage devices. The course content includes:

- Introduction to energy storage
- Types of battery storage devices commonly used, discharge times and available ratings
- Storage in the context of relevant frameworks, such as DS3 in Ireland
- Grid connection for energy storage
- Design considerations, focussing on battery storage.

### Introduction to Power Systems

This training course provides a basic introduction to power systems and is suitable for non-technical delegates.

- Basics of electricity and power systems
- Overview of generation
- Network planning
- Electricity trading arrangements
- Harmonics and power quality
- Future networks and equipment.

### Advanced Electricity

This training course provides a more advanced overview of electrical concepts and is suitable for technical learners.

- Fundamentals and control
- Power system planning
- System synchronous stability
- Phase imbalance and harmonics
- Offshore transmission systems
- Future networks and equipment.

### Introduction to Electricity Markets

This training course provides an introduction to the Electricity Market.

- Evolution of the British electricity industry
- Trading, balancing and settlement under BETTA
- Interactions with networks, including charging and system services
- Future developments including DSOs and flexibility.

### Introduction to Power System Analysis and Grid Compliance

This training course provides an introduction to power systems and is suitable for technical learners.

- Power system analysis techniques and what each study provides: load flow, reactive power, power factor, fault levels
- Practical process of connecting generation to the network; application process, technical information required by the distribution network operator and connection time scales
- Compliance studies required when connecting generation; voltage flicker, transformer energisation and harmonics
- Introduction to power system protection.

### Offshore Wind Farms and HVDC Training

This training course covers the basics of the electrical design of offshore wind farms and related technologies. The course content includes:

- Basic introduction to offshore wind farm technologies
- Introduction to offshore wind farm electrical design
- Array and transmission system voltages
- Issues related to long high voltage AC cables
- Latest design solutions for wind farms further away from the shore
- Technical complexities and potential solutions
- Lessons learned
- Simulations required for design work
- Review of HVDC technologies
- Operations, maintenance and safety
- Commercial and technical challenges.

## Interconnectors

An in-depth look at the role of Interconnectors and the way that they can support the market, the grid infrastructure and the development of renewables. This includes:

- The Why of Interconnectors – the benefits they bring
- Introduction to the market – regulation and incentives
- The What of Interconnectors – looking at the technical aspects and component parts
- The How of Interconnectors – design, planning and consenting, installation and risks
- Offshore grid infrastructure.

## Transmission and Distribution System Planning

This course provides basic and advanced level information on transmission and distribution system planning. The course content includes:

### Transmission system planning

- Basics (transmission voltages, network topology, overhead lines and cable ratings)
- Planning and security of supply standards
- Transmission network expansion
- Generation connection
- Demand connection
- Transmission planning studies
- Transmission overhead line routes.

### Distribution system planning

- Basics (distribution voltages, network topology, overhead lines and cable ratings)
- P2/6 security of supply standard
- Thermal constraints
- Voltage and reactive power control
- Planning studies.

## Connecting Generators to the UK Networks

This training course provides new and existing power plant developers knowledge about basic power systems, the process of making a new generation application, generator related issues and connection requirements. The course content includes:

- Power system operation overview
- Types of generation and their penetration levels in the network
- Types of battery storage devices commonly used
- Reactive power requirements from generators
- Generation application process
- Technical Information required by the DNO
- Worked example: Complete an ENA form
- Connection timescales
- Stability and power quality issues
- Introduction to Protection
- Transmission system connected generator requirements
- Distribution system connected generator requirements.



## G99 Training

EREC G99 was issued in July 2018 by the Energy Networks Association (ENA) following the assimilation of the EU Commission Regulation on harmonising network standards into GB Distribution and Grid Codes. Our G99 course includes:

- A quick guide to the UK power sector
- Connection process overview
- Brief overview of changes from G59
- Connection arrangements
- Connection applications
- Type classification of generators
- Technical requirements for generators and requirements
- Overview of forms required for connection
- Compliance and connection process for each generation type.

## P28 Training

Engineering recommendation (EREC) P28 issue 2 was published by the Energy Networks Association (ENA) in 2018 and it became applicable on the 23rd May 2019. This course will cover:

- Power quality and its importance
- A quick guide to the UK power sector
- Causes for rapid voltage change (RVC) and flicker
- Brief overview of the changes from P28 issue 1
- Flicker and voltage fluctuation limits (compatibility, planning and emission)
- Three-stage flicker assessment

- RVC assessment
- RVC and flicker measurement
- Changes made in the Distribution Code and the Grid Code (related to P28 issue 2)
- Potential mitigation techniques.

## EIA and Noise Assessment Training Courses

### Environmental Impact Assessment

This training course provides a detailed introduction to the practice of Environmental Impact Assessment (EIA) specifically focusing on energy related projects in a UK context. This course will provide guidance on the key requirements, issues and practices. It covers:

- Evolution of EIA
- Current policy and legislative requirements
- The EIA process, key stages and interdependencies; including scoping, screening, consultation, design, impact assessment, establishing significance, mitigation and monitoring
- Challenges facing EIA projects
- Good practice and effective management of the EIA process.

### Environmental Noise Training (including wind farm and substation noise)

Our specialist noise team offer a range of bespoke courses which provide an introduction into noise measurement, modelling and assessment. Our team tailor the content to suit the attendees but regularly offer specific training on wind farm noise and noise assessments for electrical infrastructure projects. The length of our noise training courses range from an hour long session on hot topics to an intensive two day course. Common module topics include:

- Introduction to acoustic principles
- Baseline noise monitoring
- Noise prediction / modelling
- Assessment and mitigation
- Planning appeals and Public Inquiries
- Noise related planning conditions
- Compliance monitoring and complaints investigations
- Hot topics and lessons learned.

Our experienced team includes Expert Witnesses and former lecturers in acoustics who deliver training in an easily digestible and interactive manner.

### GIS Training

TNEI's Site Services team have delivered GIS training both in the UK and internationally and would be happy to put together an 'Introduction to GIS' programme to suit your needs.

For further information on any of our training courses or to discuss bespoke requirements, please email [training@tneigroup.com](mailto:training@tneigroup.com).

# Our Experience

## Case Studies

**Bangladesh Distribution and Transmission System Operators**  
TNEI has delivered training on network planning to the Bangladeshi power sector including both distribution and transmission companies. The training was attended by 400+ participants.

### IPSA Training Courses

We regularly deliver software application training programs for TNEI's proprietary software IPSA to numerous clients such as UK DNOs, consultancies and academic bodies.

### G99 Training Courses

TNEI's experienced trainers have delivered G99 training to a variety of stakeholders in the energy industry.

### Energy Storage Seminar

TNEI hosted a public seminar in London to guide developers on how to make a storage site happen in practice. TNEI consultants and other industry partners presented to a group of 50 industry stakeholders on what can be done to identify the right revenue streams and develop a site quickly and cost-effectively taking grid connection, compliance, and environmental constraints into account.

### Grid Connection Workshops

Delivered to Wind and PV developers, the course was targeted to the requirements of different scales (e.g. private wire, rooftop PV, and large scale wind development).

### Electricity Engineering Course for Ofgem and BEIS

The delivery and development of an electrical engineering training package for the Office of Gas and Electricity Markets (Ofgem) and Department for Business, Energy and Industrial Strategy (BEIS).

### Wind Farm Noise Monitoring, Modelling and Assessment

Delivered to various renewable power plant developers and local councils by our planning and noise assessment team.

### Training with Irish Wind Energy Association (IWEA)

TNEI has delivered training courses in Ireland (with IWEA) on Interconnectors, Energy storage and Co-location technologies.

### On-site training for Vestas

This training programme was developed specifically to meet the client's requirements at their Singapore Engineering Centre. This included topics on:

- Basic introduction to offshore wind farms technologies
- Types of simulations: load flow, short circuit, dynamics, harmonics & flicker and protection
- Review of HVDC technologies
- Operations, maintenance and safety
- Commercial and technical challenges.

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## Testimonials

*"Really well presented and thought out training schedule. Very thorough, perfect for electrical engineers"*

*"Thorough and well presented"*

*"Both tutors were really friendly and interactive with all of us. Happy to answer any questions we had and tried their best to help us through the content"*

*"Gives me a much better fundamental understanding of power networks"*

## Key Contacts



**Muhammad Ali**  
Principal Consultant

Ali is a Chartered Electrical Engineer with over 7 years' experience working as a power systems consultant. He has an excellent background in power systems and has provided consultancy on several renewable energy projects. He has delivered training courses both in the UK and internationally. Ali leads our training programme and would be happy to discuss your bespoke training requirements.

Email: [training@tneigroup.com](mailto:training@tneigroup.com)

Tel: +44 (0) 161 233 4838



**Maria Smith**  
Training Manager

Maria is TNEI's dedicated Training Manager. For more information on booking any of our training courses, please contact Maria.

Email: [training@tneigroup.com](mailto:training@tneigroup.com)

Tel: +44 (0) 161 233 5949



## Contact

We are a specialist, independent company. That's why we can offer a flexible, personal service and help our clients quickly and efficiently, without all the big corporate distractions.

But most of all, we love to solve problems.

For more information about who we are and what we do, please contact: [info@tneigroup.com](mailto:info@tneigroup.com)

[tneigroup.com](http://tneigroup.com)



Manchester  
2nd Floor Bainbridge House  
86 - 90 London Road  
Manchester  
M1 2PW  
+44(0)161 233 4800

Newcastle  
7th Floor West One  
Forth Banks  
Newcastle Upon Tyne  
NE1 3PA  
+44(0)191 211 1400

Glasgow  
7th Floor  
80 St. Vincent Street  
Glasgow  
G2 5UB  
+44(0)141 428 3180

Cape Town  
1st floor  
Willowbridge Centre  
39 Carl Cronje Drive  
Cape Town 7530  
+27(0)21 974 6181

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