tnei

A specialist energy consultancy

Training Services

tneigroup.com

Training courses from TNEI

TNEI has 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.

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

Our courses are suitable for:

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

tneigroup.com

Why train with TNEI?

Our Approach

TNEI's training courses are delivered in small groups, meaning the sessions are highly engaging and the course content is well understood by delegates. Courses can be delivered online, at our TNEI offices or in-house, depending on delegate preference.

Our People

Courses are delivered by our expert tutors who have strong academic backgrounds as well as commercial knowledge and experience, meaning they have a unique industry perspective which they can share with delegates.

Your TNEI certificate

All delegates will receive a certificate of attendance to certify their completion of the course.

500
Our staff have over 500 years of collective consultancy experience

51
TNEI has experience in over 51 countries, delivered by staff speaking 25 languages

1640
TNEI consultants have delivered over 1,640 hours of training to date

19
We have 19 training courses in our portfolio and can deliver bespoke courses to suit individual company needs

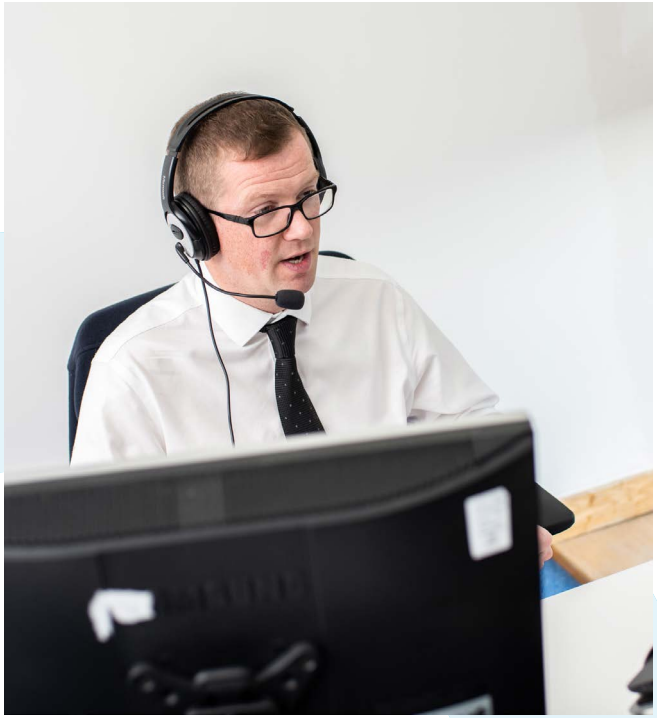
How delegates rate our courses

85%
of delegates score our courses overall 8, 9 or 10 out of 10

100%
of delegates would recommend their training course

100%
of delegates said their expectations were met on their training course

9/10
Delegates scored the delivery of our courses on average 9 out of 10.



What delegates say

"Excellent depth of knowledge and experience concisely communicated"

" Training was delivered in a professional but informal style"

"Instructors were well versed in their subject. They answered all the questions without rushing through and at a very comfortable pace. It was a highly interactive training and I am very satisfied"

"Well presented with a vast wealth of knowledge and experience coupled with the willingness to share this throughout the session. Very useful training course delivered professionally"

"A good course providing information on the power systems industry. Electrical principles applied to real world problems and limits."

"Excellent course and G99 was well explained by competent trainers"

Training Courses

tneigroup.com

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

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

IPSA in a day - IPSA Training Crash Course

Our online IPSA crash course is a hands-on training course with a focus on modelling power system components using the IPSA software package, including an introduction to load flow, fault level theory and fault level calculations. No previous knowledge of IPSA is required, but a knowledge of power systems is helpful.

The IPSA crash course covers the following modules:

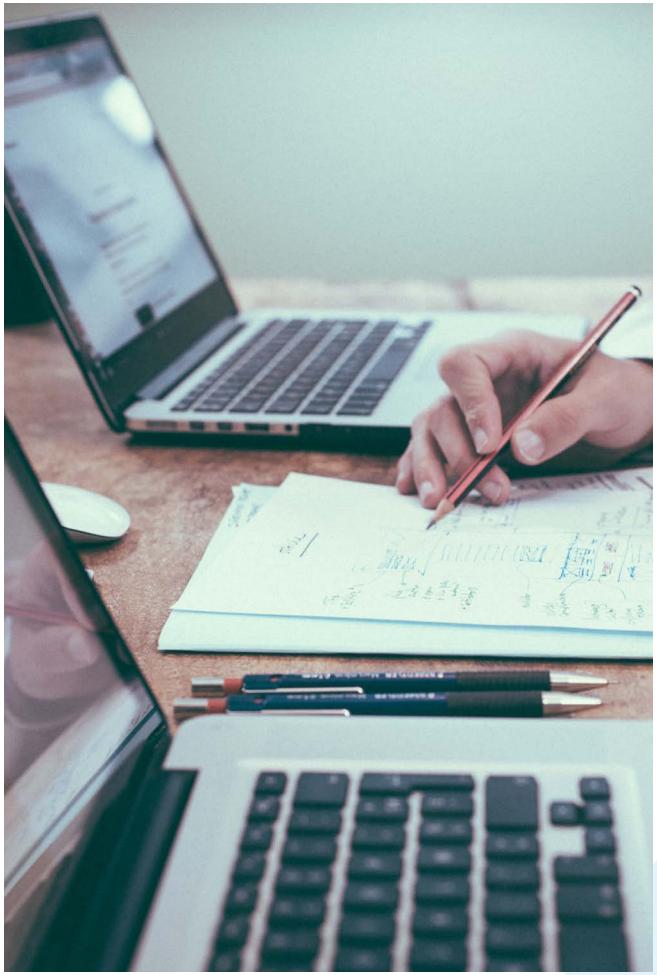
- IPSA Interface and Network Drawing
- Database creation
- Data Entry
- Load Flow Studies
- Fault level analysis

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:

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



EREC Standards Training Courses

P28 Issue 2 Training Course

Engineering recommendation (EREC) P28 issue 2 was published by the Energy Networks Association (ENA) in 2018 and became applicable on the 23rd May 2019. The latest versions of the Distribution Code and the Grid Code have also been updated accordingly, and refer to P28 issue 2. Those who propose to connect disturbing equipment which might cause voltage fluctuation (flicker or rapid voltage change), and those who carry out assessments concerning the suitability of connecting such equipment to the public electricity supply systems (distribution and transmission networks) need to be aware of this new revision.

The course content covers:

- 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)
- Assessment of disturbing equipment and fluctuating installations
- Three-stage flicker assessment
- RVC assessment
- RVC and flicker measurement
- Guidance on application for electric motors, furnaces, electric vehicles, wind turbine generators, photovoltaic installations, energy storage, household equipment and welding equipment
- Changes made in the Distribution Code and the Grid Code (related to P28 issue 2)
- Potential mitigation techniques

G99 Training Course

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, known as Requirements for Generators (RfG), into GB Distribution and Grid Codes. It has been written to comply fully with RfG as well as including other requirements for connecting into the GB Power System.
It encompasses and replaces the long serving EREC G59 with changes to the application process, compliance requirements and commissioning requirements. G99 generators will need to be aware of the new process and requirements.

The course content covers:

- The connection process
- Changes from G59
- Type classification of generators
- Connection arrangements
- Connection application
- Technical studies required from generators
- Generator technical capability requirements
- Overview of forms required for connection
- Compliance and connection process for each generation type basic overview of the principles of grid connection

G5/5 Training Course

This short course provides an insight into the newly issued harmonics engineering recommendation (EREC) by ENA which is coming in effect from 17th June 2020. This new EREC is a major upgrade from the previous G5/4-1 that was last updated in October 2005.

This course provides an excellent opportunity to learn from some of the contributors who helped shape this new EREC document, having many years of experience in solving real-life complex harmonic compliance issues.

The course content covers:

- What are harmonics and how they are generated
- Effects of harmonics on equipment
- Background to the G5/5
- Key changes to the compatibility and planning levels from G5/4-1
- Changes to the aggregation formula
- Revision of Stages 1, 2 and 3
- Resonant plant
- Stage 3 harmonic specification and compliance report

Power Systems and Grid Connection Training Courses

Understanding Electrical Projects for New Developers

This course will enable developers to gain a better understanding of their electrical project. The course begins with the basics of power systems introducing the key concepts and identifies challenges that are faced when integrating variable renewable energy technologies. Delegates will learn the work required during pre-bid assessment and the technical requirements a developer must keep in mind when developing the project, looking at which sources of revenue could be targeted.

The course content covers:

- Power System foundation concepts
- Challenges with integrating variable renewable energy technologies into the network
- Pre-bid assessment
- Technical requirements and sources of revenue

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:

- 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

Energy Storage Training

TNEI's Energy Storage course provides an insight into the energy storage devices including battery storage, covering energy storage technologies from multiple angles discussing the electrical, civil, financial and safety aspects.

The course content includes:

- Introduction to energy storage
- Types of storage devices and technologies
- Storage in the context of relevant frameworks
- Connecting to the GB & the Irish network
- Business models and revenue streams
- System design considerations

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 agenda 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
- Voltage step change and flicker issues
- Transmission system connected generator requirements
- Connection timescales

Connecting Offshore Wind Farms to the Grid

This course looks into the grid aspects associated with the connection of an offshore wind farm. This course will examine the typical technical, commercial, and regulatory challenges associated with the design and operation of an offshore wind farm's connection to the onshore transmission network.
The course will cover:

- Background summary of offshore wind in GB
- Typical grid connection programme
- Technologies involved (wind turbines, offshore substation etc)
- Feasibility and Pre-Application
- Classification of transmission works
- Overview of the connection application process and the Connection Infrastructure and Options Note (CION)
- User commitments (underwriting transmission works)
- Offshore transmission owner (OFTO) process
- Overview of Grid Code compliance requirements
- Operational notification compliance process (ONCP) and
- Charging system and methodologies

Wider Network Operation

Introduction to Electricity Charging Regime and Use of System Costs in GB

A relatively detailed examination of the prevailing charging regime is covered in this course and it explains how the construction, maintenance, and operation of network assets in GB are paid for – both on the transmission and distribution networks.

The course will cover:

- Evolution of the British Electricity Industry
- Market Elements (stakeholders involved in generating, trading, regulating, and balancing of electricity)
- Overview of all tariffs and costs (such as use of system costs applicable to users of transmission and distribution network)
- Examination of charging methodologies used on transmission and distribution networks (how are the tariffs derived)
- Proposed changes to the charging regulatory framework

Introduction to Generator Transmission Connections in GB

This course is designed to highlight the main considerations relating to the connection of generators to the transmission network in GB. It will include a discussion about process, frameworks, regulations, and applicable commercial aspects.

Topics covered include:

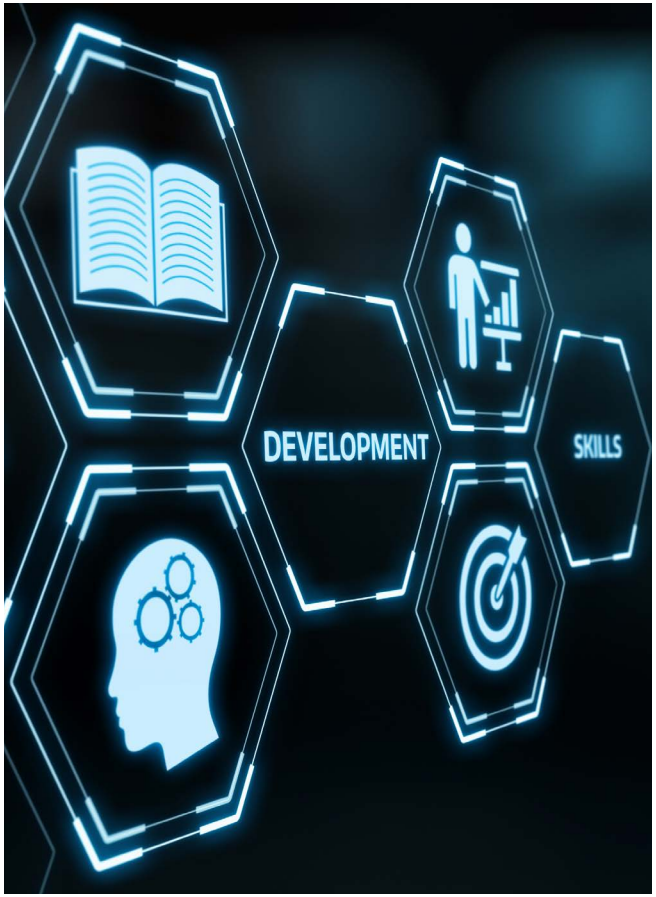
- Role of key stakeholders, such as the electricity system operator (NGESO), transmission network owners (TOs), the Department for Business Energy and Industrial Strategy (BEIS) and the regulator, the Office of Gas and Electricity Markets (Ofgem)
- Overview of the National Electricity Transmission System (NETS)
- Classification of transmission works
- Bilateral Connection Agreement (BCA) application process
- BCA and Construction Agreement Contracts overview
- User commitments and network charging methodologies
- Feasibility and Pre-Application for generator connections
- Overview of Grid Code compliance requirements
- Operational notification compliance process (ONCP) and the User Data File Structure (UDFS)

Introduction to GB Electricity Markets

This course provides an overview of the electricity market in the UK. It includes a number of interactive exercises to help delegates understand the principles that are taught.

The course will include:

- Evolution of the British electricity industry
- Market elements (stakeholders involved in generating, trading, regulating, and balancing of electricity)
- British electricity trading and transmission agreements (BETTA): Markets & Trading
- BETTA: Balancing & Settlement
- Network interactions (between industry stake holders)
- Future direction for electricity market



EIA Training

Environmental Noise Training Course

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

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

For further information on any of our training courses or to discuss bespoke requirements, please email **training@tneigroup.com.**

Our Experience

tneigroup.com

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

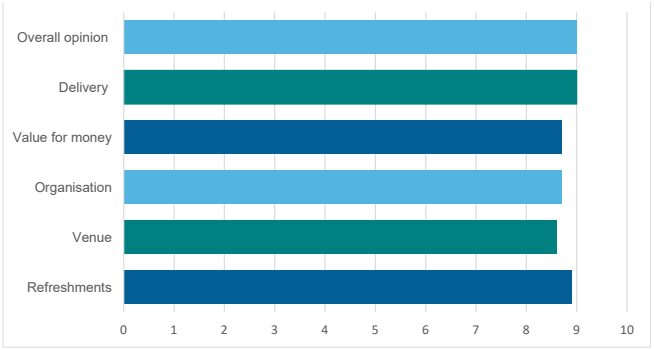
Training with Irish Wind Energy Association (IWEA)
TNEI has delivered training courses in Ireland (with IWEA) on Interconnectors, Energy storage and Co-location technologies.

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:

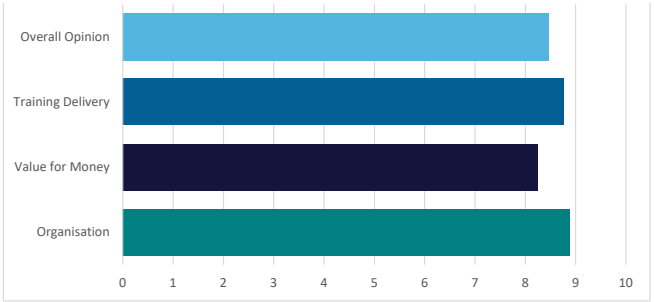
- Basic introduction to offshore wind farms technologies
- Types of simulations: load flow, short circuit, dynamics, harmonics & flicker and protection
- Review of HVDC technologies
- Operations, maintenance and safety
- Commercial and technical challenges.

Course Feedback

Introduction to IPSA course - attendee feedback



G99 course - attendee feedback



Get in touch

Muhammad Ali
Principal Consultant and Training Manager

Ali is a Chartered Electrical Engineer with over 9 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
Tel: +44 (0) 161 233 4838

tnei

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

tneigroup.com

Manchester
+44 (0)161 233 4800

Newcastle
+44 (0)191 211 1400

Glasgow
+44 (0)141 428 3180

Cape Town
+27 (0)21 974 6181

Dublin
+353 (0)1 903 6445