A specialist energy consultancy

Future energy systems

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Electricity systems are undergoing a period of rapid and significant change as decarbonisation efforts have prompted the connection of large volumes of distributed generation, while uptake of low carbon heat and transport is increasing. These shifts in electricity network operational philosophy and the end-use of energy are creating new constraints, predominantly on distribution and low voltage networks, but transmission networks are also feeling the effects. Disruptive business models entering the power sector are also creating new challenges and opportunities.

Using traditional methods of network planning, resolving these constraints would require substantial investment and the installation of new capacity. However, innovative technical and commercial solutions are being developed by industry. These can provide incremental system capacity rapidly and at lower cost, and also reduce the risk of stranding assets. More broadly, the power sector is transitioning to a “whole system” approach, requiring more innovative regulation and governance.

TNEI is a leader in the provision of consultancy advice to electricity utilities and regulators, developers, and government on the challenges and opportunities presented by evolving energy systems. We are technical experts in the design and operation of power systems and this is complemented by a strong understanding of the regulatory and commercial environment as well as innovative grid technology and techniques. We also provide power system software solutions for smart network innovations both through our proprietary software, IPSA2, as well as through the development of custom software models and tools.

TNEI is supporting a number of distribution and transmission network operators in their network innovation ambitions, primarily in Low Carbon Network Fund and Network Innovation Competition projects including Flexible Networks for a Low Carbon Future, Smart Street, FALCON and Equilibrium.

We also provide specialist technical and commercial expertise to UK and Irish network operators to understand the implications and risks of forecast future energy changes and the applicability of a range of smart network solutions such as active network management.

Our knowledge and experience of smart grids supports the transition to a more flexible and intelligent future energy system.
Case studies

Service: Network strategy development
Client: Western Power Distribution (WPD)

TNEI supported the development of a long term master plan for the WPD South West network, in order to accommodate the large levels of solar PV generation expected to connect into its distribution network. This included analysis of emergent technology and commercial solutions.

Service: Low Carbon Networks Fund Innovation Project support
Client: Scottish Power Energy Networks

The ‘Flexible Networks for a Low Carbon Future’ project trialled dynamic thermal ratings, advanced network automation, energy efficiency measures and improved network monitoring on the HV and LV networks. As a project partner, TNEI provided power system modelling expertise, development of improved planning methodologies and software tools, and stakeholder engagement to facilitate the integration of these into “business-as-usual”.

Service: Network charging and flexibility advice
Client: Ofgem

Throughout 2015 and 2016, we supported the UK regulator, Ofgem’s work on flexibility. We provided specialist advice on how flexible energy system technologies, like energy storage, might affect electricity network charges. In collaboration with CEPA, we assessed whether current charging arrangements may be acting as a barrier to the provision of greater flexibility in the power system, and whether new network charging approaches may be required for future distribution networks and distribution systems.

Some of this work helped to inform the 2016 BEIS / Ofgem call for evidence on ‘A Smart, Flexible Energy System’. Since then, we have provided further advice to Ofgem on different charging principles for energy storage and provided international case studies which demonstrate different approaches to setting network tariffs.

Service: Active Network Management Good Practice Guide
Client: Energy Networks Association

TNEI provided technical content for a guide that set out current good practice for the commercial arrangements and technical deployment of Active Network Management (ANM) technologies. This included specific technical solutions and communications, analysis and forecasting, control room integration and future evolution of technology and industry codes.

Key contacts

Dr Charlotte Higgins
Principal Consultant

Charlotte has an extensive background in the energy sector with over 16 years of experience in the field of systems analysis, particularly for power systems applications. She has an excellent overview of technical, regulatory and economic considerations for the development of transmission and distribution networks, smart network innovations and renewable generation. Charlotte was TNEI lead for delivery of the SP Energy Networks project, “Flexible Networks for a Low Carbon Future” and the Active Network Management Good Practice Guide.

Gordon McFadzean
Senior Consultant

Gordon leads the delivery of projects relating to electricity, strategy and regulation and has a technical overview of the network planning and system operation challenges facing the energy industry, particularly in the UK and Ireland, and regularly advises generation clients on strategies for getting connected to the grid. He has a strong technical background in power systems analysis and power systems modelling and a good understanding of wholesale energy markets, ancillary service markets and network regulation, with a particular focus on use of system charging.

Stephanie Hay
Senior Consultant

Stephanie has been a power systems consultant for over 5 years. She has gained significant experience in electrical system studies, undertaking various grid connection studies for network planning and grid impact assessments, as well as grid compliance assessments for onshore and offshore generation connections.

Stephanie’s main focus however, is on providing technical and market expertise on emerging technologies and delivering concept, innovation and strategy projects for large industry organisations. Her interest in this area of power systems was prompted by her PhD research on the impacts of integrating active network management and smart grid technologies into the distribution control room environment and she has remained involved throughout her career.

Get in touch

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 our future networks services, please contact Gordon McFadzean; email: gordon.mcfadzean@tneigroup.com or call: +44 (0)161 233 4810.

See photo: solar panels, Smart Grid smart meter, Smart Grid smart meter, Smart Grid smart meter.
Contact

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