



Working with ElectraLink to provide innovative analytics services for DNOs

The DNO Challenges

With the unprecedented level of change taking place in the electricity market, Distribution Network Operators face some key challenges to their traditional methods of operation.

The impending mass-rollout of smart meters will result in the number of meter installs nationwide increasing from approximately 140,000/month to 150,000/week. It is predicted that at least 2%¹ of these installs will uncover issues that require DNO attention, drastically increasing the load on DNO workforces. Current processes only identify these issues by exception, so any ability to predict their prevalence would be of great use to DNOs in their workforce planning.

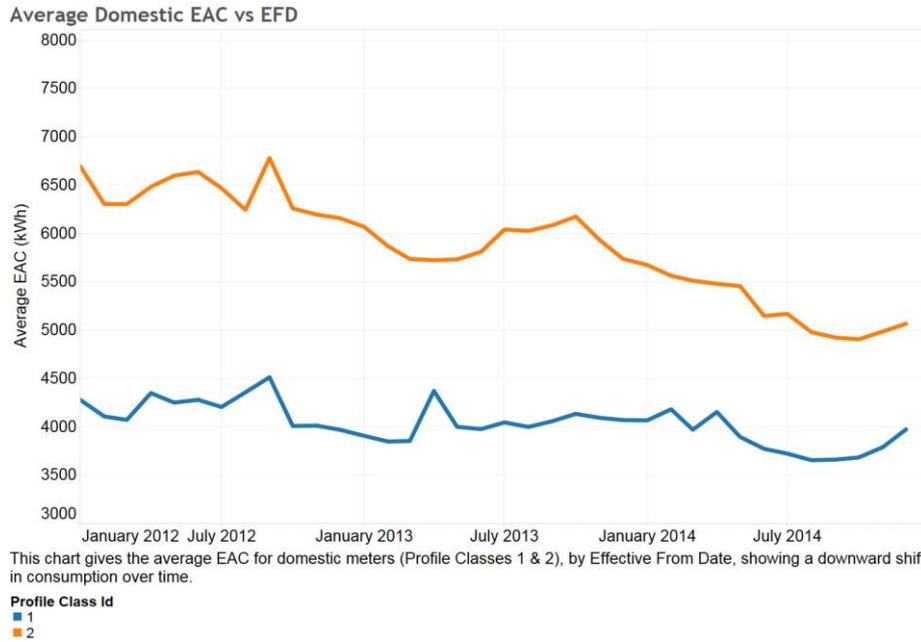
In addition, the increased uptake of small-scale distribution-connected generation, low carbon technologies such as heat pumps and electric vehicles, as well as energy efficiency measures triggered by the increase in smart metering will all have a dramatic impact on how - and how much - energy is consumed across the Low Voltage (LV) networks. This change makes the prediction of where investment is required to upgrade the different parts of the network that will be stressed in the future particularly challenging. Furthermore, as part of the new RII0-ED1 price control measures, the DNOs are all being challenged to make more use of Smart Technology to achieve savings, and identifying where these multi-year investments can make the most difference, but with very little previous experience of their impact to use.

Analytics and Modelling Opportunities

This uncertain future is a great environment for the use of predictive analytics to better understand the impact of these challenges and ensure that investments are targeted correctly; both to ensure that sufficient resource is available in the right areas for the smart roll-out, and that the future use of the network can be supported.

To help with these predictions, ElectraLink's data can be particularly valuable. Data flows across ElectraLink's Data Transfer Service (DTS) to support the settlement process. We see information flagging where asset issues are identified, along with data such as Estimated Annual Consumption (EAC) for individual properties, which can show how the use of the network is changing.

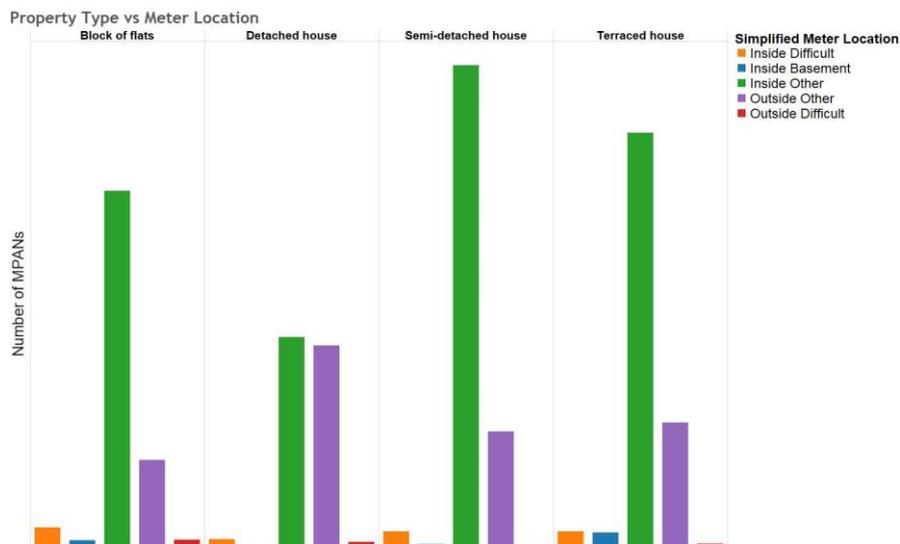
¹ <https://www.ofgem.gov.uk/ofgem-publications/47072/riioed1deccostassessment.pdf> p69



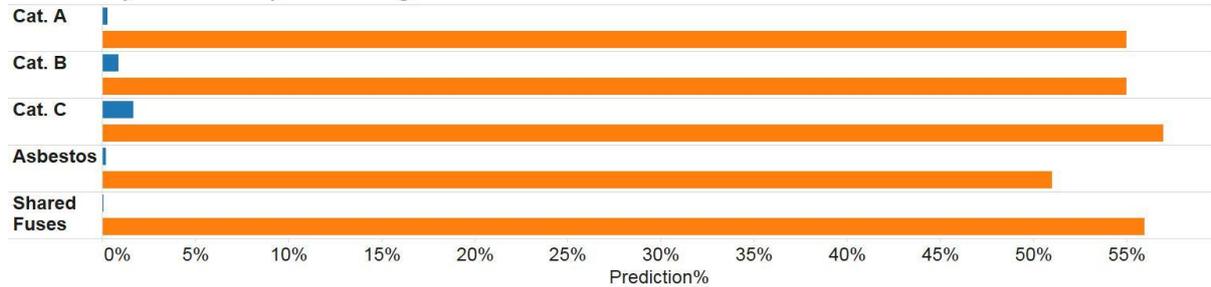
Carrying out these analytics will need input from a number of different sources and sophisticated modelling together with global experience of techniques for such difficult predictions. These activities would seem to fit well with a partner’s key skills and assets.

ElectraLink & EST SMID

ElectraLink already has experience of working with partners to produce analytic solutions for the smart meter rollout. Combining our information on the outcomes of site visits with the Energy Saving Trust’s UK property database, we have created the Smart Meter Installation Dataset. The SMID will help Suppliers and Meter Operators with their roll-out planning by providing useful data like the meter location, and predicting the likelihood of issues which may hamper installations.



Probability of Correctly Predicting Asset Issues



This chart shows the comparative accuracy of predicting the existence of an Asset Issue at a property using random sampling vs the SMID data.

Data Source

- Random sample
- SMID

Similar analysis providing insights into the individual types of issues which will require DNO attention would be of great value to DNOs who will see their workloads increase dramatically when the roll-out starts and more of the asset issues are uncovered. As the only single source of the data flows that highlight asset issues across the GB market, as well as information relating to the number of smart meter installs currently taking place, ElectraLink can provide the building blocks for this analysis.

Types of Meter Asset Issue Codes					
Category A		Category B		Category C	
A01	Cut out currently operating hot (signs of overheating)	B01	Fuse Carrier welded in to cut out base	C01	Signs of overheating – no damage to cut out or premises
A02	Service Cable currently operating hot	B02	Cut out loose on meter board	C02	Signs of Bitumen Compound leaking
A03	Defective/weakened fuse carrier contacts	B03	Damaged/missing phase barriers	C03	Small fuses ie less than 60A
A04	Physical damage to cut out/service cable requiring immediate action	B04	Damaged/broken cut out terminals - missing terminal screws	C04	Concern over phase rotation incorrect at cut out
A05	Visual indication of burning/smell of smoke/smoke	B05	Non With-drawable fuses by design	C05	Shared fuses/cut outs/neutral blocks
A06	Audible sounds of arcing	B06	Cut Out unable to accept 16mm meter tails	C06	Metal Clad Cut Out
A07	Exposed live conductors (live or neutral)	B07	Meter tails need to be replaced but cannot be changed by competent staff	C07	Seal Tags Broken on cut out
A08	Broken fuse carrier – access to live components	B08	Unhinged metal cut out covers over un-insulated conductors	C08	Cut out with a fused neutral
A09	Exposed conductors – evidence of theft/vandalism/damage	B09	Asbestos boards/materials identified – no immediate risk	C09	Damaged or missing service cable guard
A10	DNO Earthing issues which present an immediate risk to Consumer/MO			C10	Service cable in cavity
A11	Disconnected or severely damaged DNO earth terminal/protective conductor			C11	Asbestos barriers, insulation, fuse shields identified
A12	Currently damaged and exposed asbestos components including meter boards			C12	Excessive vegetation growth
A13	Visible possible airborne asbestos fibres present at the service position			C13	Unacceptable close proximity to gas service
A14	Polarity identified as incorrect at DNO cut out			C14	Fed from distribution board – local/remote from meters
A15	Immediate risk to the public or customer due to current service position location				
A16	Service position insecure and exposed to immediate weather damage				
A17	Risk of electric shock or electrocution				
A18	Risk of fire at service position				



LCNF Network Planning Experience

DNOs have been investigating how their networks can facilitate the take up of low carbon technologies and energy saving initiatives with funding provided by Ofgem's Low Carbon Network Fund (LCNF). Many of the LCNF projects fall under the wider term of 'smart grids' and look at how to maintain or increase security of supply as the UK transitions to a Low Carbon economy, as well as drive more efficient network reinforcement planning as required under the RIIO-ED1 guidelines.

For example Western Power Distribution, as part of Project Falcon, has carried out analysis of EACs against feeder-level half-hourly data and shown that this data provides a reasonable approximation for consumption which could be used in a network planning model that models future demand scenarios and helps predict more accurate load profiles.

At present all LCNF projects have been run within small targeted sample areas however Ofgem has been keen to stress that the outcomes of the projects need to be taken and applied to the wider market.

With the challenges under RIIO-ED1 to achieve further savings and ever increasing reliability requirements the need to understand the future changing needs of the network are of evermore importance.

With nationwide access to MPAN-level consumption data dating back to April 2012, as well as a proven track record of engaging with third parties to enhance that data and provide powerful insight into the GB Energy Market, ElectraLink are well placed to assist our partners in capitalising on this opportunity.

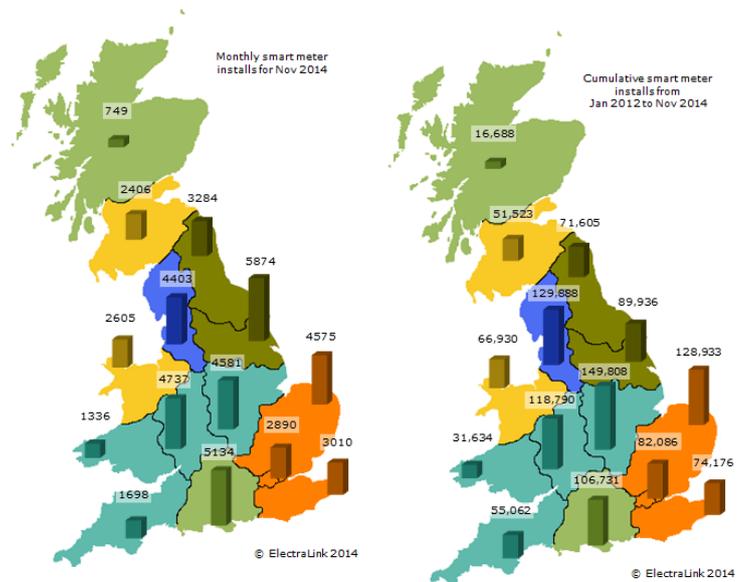
Other Insight from ElectraLink Data

In addition to the EAC/AA data, we also see the volumes for half-hourly metered distribution-connected generation. By allocating each generator a generation type (e.g. PV / Wind etc.), for instance by analysis of the interval meter data, insight can be gained into the timing and growth of these future stresses on the network.

This understanding of how future usage is going to change will be of great importance to DNOs. As many of these changes are driven by demographic drivers and other external influences, these changes are hard for DNOs to predict simply from their network measurements. For this network data and DTS data needs to be combined with other data, e.g. demographic information, and then predictive techniques to provide views of the future scenarios.

For this national information is particularly useful. This prediction of future use is not naturally within the DNOs key areas of expertise, so modelling on a combined basis makes a great deal of sense, similar to the development of the Transform model used during RIIO-ED1 planning.

Another national dataset we have is a full view of completed smart meter installs. As well as providing an overview of how many smart meters are out there at national, GSP Group or postcode levels, this data could be used to correlate with other studies of changing market behaviour across the country.



ElectraLink vs DNO data

As much of the data discussed here is important for their operations, DNOs do receive it themselves through the settlement channels. However, we feel that using ElectraLink data has certain advantages over dealing directly with the individual DNOs.

Firstly, the central nature of ElectraLink means that we see data flows from all 6 DNO companies, meaning there is a single point of contact. This also means that national views of the data can be provided with minimal effort, helping to make any analysis more robust.

Our data is already processed and stored in an easily accessible relational database format, reducing any processing time, and ensuring all the data is available in a single format, whereas the 6 DNOs will most likely have different systems, which could cause problems.

And also our data is updated daily. For EAC data, DNOs only receive quarterly updates from Data Aggregators, where as we see any updates (and by extension any changing consumption) on a D+1 basis.



Get in Touch

In an evolving and uncertain market-space, we believe there is great value to be gained by developing innovative analytic solutions to assist DNOs in planning the future operation of their networks and meeting their RIIO-ED1 targets. Furthermore, we feel that ElectraLink is ideally positioned within the industry to provide data and support to those businesses who want to take advantage of these opportunities.

For further information or to discuss potential opportunities contact lan.Scougal@electralink.co.uk 02074323845.