Secondary substation load profiling - identification and visualisation of changes
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Summary
• Analytical and Graphical techniques to classify Secondary Substations (SS) load profiles
• Tools for understanding localised load growth and illustrations of changing load profiles
• Findings on Distributed Generation load masking
• Feasibility of intelligent dynamic load profiling, geo-data mining and visualisation of network data

Load Profiling Techniques
• LCNF T1 funded Dist. Network Visibility (DVN)
• 9000 SS 11/0.43kV equipped with RTUs

Automated load profile library

Principal Component Analysis
• Used to manage data dimensionality
• 48 point daily profile - most dominant 10 principal components used to describe profile

Load Profiling
• Weekly profiling - Load Profiles for a group of secondary substations in London

Embedded Generation
• Profiling techniques identify unconventional profiles
• Step change quanta used to decompose load at substation transformer

Conclusions
• Distribution Network Visibility tool normalises load profiles and assigns them to a standard library type using a k-means clustering technique,
• Principal Component Analysis has advantages in reducing data dimensionality,
• Step changes quanta can be used to identify presence of reasonably sized LV generation which is masking load
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A synopsis follows:

The poster outlines the analytical and graphical techniques being used to classify secondary substation load profiles and identify when changes occur. The visualisation techniques being developed to assist Planning Engineers with network assessment of load growth and changing load type are illustrated. The paper also details the projects findings in respect of DG connected at low voltage (LV) and the masking of load.