This research will cover the options for running ANM schemes as a ‘business as usual’ case, and the impact that this could have on domestic demand customers’ energy bills.

The growth of wind generation in distribution networks is leading to the development of Active Network Management (ANM) strategies. ANM systems aim to increase the capacity of renewable and distributed generation (DG) that can connect to the network. In addition to DG, ANM schemes can also include storage devices and Demand Side Management (DSM) strategies. Currently ANM schemes are mainly part of network research and development programmes, funded through network innovation schemes. In future, ANM schemes will need to cover the costs of establishing such a scheme through payments from the network company and the users of the network. This research will cover the options for running ANM schemes as a ‘business as usual’ case, and the impact that this could have on domestic demand customers’ energy bills.

To determine a business as usual case for ANM schemes, we must first consider the current costs, and processes. The following diagrams indicate possible contractual arrangements for non firm bulk installation costs and finally an example of ANM costs from the Orkney ANM scheme [1].

In addition to DG, ANM schemes can also include storage devices and Demand Side Management (DDSM). The installation of storage can result in rewards for customers, and possible reductions in energy bills. Changes to connection arrangements for generators connecting to ANM schemes could increase customer bills by a minimal amount; however this increase will be a fraction of the cost which would be incurred as a result of network upgrades. However there will be options available for customers to participate more actively in ANM schemes through the use of demand-side management which can result in rewards for customers, and possible reductions in energy bills.

The costs of network reinforcements are recovered through a combination of connection and use of system charges depending on the voltage level of the connection. As ANM schemes become a ‘business as usual’ model, a mechanism through which the network can recover the costs of installing, operating and maintaining an ANM system must be established. The base case against which all flows are compared in Figure 4 is a standard network configuration, without the inclusion of any network management or incentives to encourage renewable energy and most domestic electricity users sourcing power from vertically integrated suppliers and large centralised generators.

The installation of an ANM scheme on the network allows more wind to connect to the network. This reduces the volume of electricity provided by conventional generating methods and therefore reduces the emissions of the distribution network.

This cost of the ANM Kit is paid for by the Wind Farm, which will experience lower connection costs than that of typical connection agreements due to the non-firm connection.

There will be higher Use of System (UoS) charges passed on to customers due to an increase in network equipment and management, this however, is lower than the costs which would be incurred if network reinforcements were constructed.

In addition to the basic recovery of costs for ANM, there is the option to create ancillary services by incentivising domestic Demand Side Management (DDSM). The installation of storage devices in the homes is being trialled by Scottish & Southern Electric (SSE) for the Northern Isles New Energy Solutions (NINES) project 3.

This research aims to:
- Discuss possible Access Arrangements for wind generators as part of ANM schemes
- Discuss the costs associated with ANM and the alternative solutions to network constraints
- Discuss the operation of ANM schemes as a ‘business as usual’ case
- Discuss the cost of ANM to domestic energy supply customers.

References


Figure 2: ANM scheme building blocks

Figure 3: Case Study of Orkney ANM Scheme. The cost of the ANM scheme on the left is substantially less than the cost of network reinforcements shown on the right. [1]. Orkney network image courtesy of SSE [2]

Figure 4: Business model for ANM schemes, based on SuperGen HDF6 Distributed Energy Business Model [4]