Guidance on the Presentation of Curtailment associated with an 'Active Network Management' Connection Offer

Introduction

The ENA Active Network Management (ANM) Working Group (WG) was formed in late 2013 and its aim is to develop consistent understanding in the emerging method of Active Network Management (ANM) and its application on distribution networks across the UK. The ANM working group comprises of representatives from UK's transmission and distribution network operators.

The group wishes to develop guidance on the presentation of the levels of curtailment associated with an 'Active Network Management' offer in order to standardise how data is presented to customers across all Distribution Network Operator (DNO) areas.

When performing curtailment analysis DNOs currently take a number of approaches:

- Analysis is undertaken in-house with curtailment presented in the offer letter
- Analysis is undertaken by a 3rd party with curtailment presented in the offer letter
- Raw data is made available for the customer to undertake their own analysis

This document aims to cover off all approaches under two key areas;

1. What the customer should expect, as a minimum, from a curtailment study within an 'Active Network Management' offer
2. The key pieces of information the DNO is expected to provide to the customer in order for them to undertake their own due diligence

What the customer should expect, as a minimum, from a curtailment study within an 'Active Network Management' offer

- General overview of the constraint and how the ANM scheme will operate in practice
- Details of the data used and general methodology
- Number and type of generation sites (Solar/Wind/Other) broken down in to Offered/Committed/Connected by conventional and actively managed connection
- Applicants position in the ANM queue
- Calculated MWh constrained
- Calculated MWh unconstrained
- Details of communications
- Details of high demand/generation customers within the ANM Zone who may significantly impact on the curtailment levels should there usage/output characteristics change
- Common sources of future uncertainty i.e. demand growth/reduction, behind the meter changes by existing generators, changes in domestic low carbon technologies etc.
- The frequency and duration of any outages or faults that may have a significant impact on the proposed connection

Appendix 1 gives an example output format.

In order to undertake their own due diligence, if requested by the customer, the DNO shall provide, but not necessarily be limited to;

- Links to all appropriate publically available information (LTDS, Heat Maps, Generation Capacity Registers etc.)
- Details of the ANM systems threshold values and operating principles
- A network model or sufficient network parameters to allow a model to be built
- Measurement point table – Measurement points that are part of the ANM, their associated network ratings and whether there is a Seasonal/Dynamic Line Rating
- One year of historic half hourly averaged readings from measurement point locations. Where inadequate measurements exist typical profiles may be used.

Appendix 1 - Example Curtailment Output

Old Town Active Network Management (ANM) Zone

Overview

The maximum export capacity through the existing Primary Transformers at Old Town Primary substation is 45MVA. Due to the level of generation activity in the surrounding area this capacity has now been reached. Due to the cost and timescales involved in the reinforcement of Old Town Primary Substation the DNO has chosen to initiate an Active Network Management solution for the area.

The Old Town Active Network Management zone will allow additional generation to be connected whilst keeping the total reverse power flow at the site to below 45MVA to ensure system security.

The ANM zone will utilise the Last In First Out (LIFO) principle when issuing out capacity on to the network.

Curtailment calculations have been performed using two years' worth of half hourly averaged data where available. If unavailable, idealised generation outputs have been used.

Existing Connected Accepted and Offered Generation Connections at Old Town Primary Substation

Conventional (Unconstrained)

	Solar		Wind		Other		Total	
	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)
Offered	0	0	0	0	0	0	0	0
Accepted	5	12	4	1.5	2	9.2	11	22.7
Connected	6	17	4	3	3	2.3	12	22.3
Total	**11**	**29**	**8**	**4.5**	**5**	**11.5**	**23**	**45**

Note – The total accepted and connected generation for the area sums to the capacity of the site. There are no outstanding offers in this example but subject to each DNOs individual policies this may not always be the case.

Actively Managed

	Solar		Wind		Other		Total	
	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)	No. of Sites	Total Capacity (MVA)
Offered	3	9	1	0.5	0	0	4	9.5
Accepted	2	5	0	0	0	0	2	5
Connected	0	0	0	0	0	0	0	0
Total	**5**	**14**	**1**	**0.5**	**0**	**0**	**6**	**14.5**

Note – The above table indicates all 'Actively Managed' sites active at the time of document issue

Customer's Anticipated Curtailment

Size of Generator (MW)	4.2
Type of Generation	Solar
Position in LIFO Queue	7
Other Generators Ahead in Queue	See Above

Table 1 - Generator Summary

	Generator Unconstrained	Generator Output Using 2015 Demand Figures	Generator Output Using 2014 Demand Figures
Modelled Output (MWh)	4095	3738	3171
Curtailed (MWh)	N/A	357	924

Table 2 - Generator Curtailment Figures

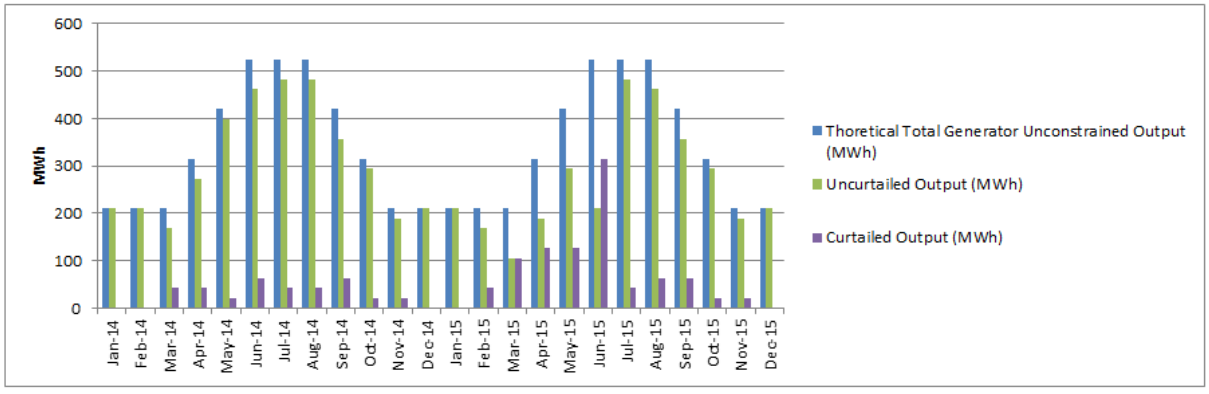

Figure 1 - Modelled Historic Output & Anticipated Curtailment

Notes – Generator Unconstrained Modelled Output (MWh) – This is the total annual MWh output that the applicants generator is expected to produce if left unconstrained using the DNOs modelling assumptions.

Generator Output Using Historic Demand Figures – By applying the principles of Active Network Management to historic data, these figures show the modelled output (After constraint) when previous years background load is used together with all committed generation.

Curtailed Output – Theoretical Unconstrained Generator Output less the Generator Output using historic demand figures

Communications

In the event of a communications failure the generator will be curtailed to a pre-defined output, usually 0, until communications links are restored. Communications availability in the area is deemed to be 99.99%

Other Factors Affecting Curtailment

The expected volume of energy curtailment is subject to future variation, either detrimental or beneficial, due to factors such as;

- Demand growth or contraction
    - Specifically in this instance there are two large industrial demand customers, the loss of which would impact on the level of curtailment
- Growth in unmanaged micro-generation connected at lower voltage levels
- Changes in network configuration,
- Behind the meter changes to existing generators e.g. changes in capacity factor due to generator changes that utilise an existing connection agreement.

Planned Outages

Due to the design of the ANM system in this instance it is not anticipated that maintenance outages on significant plant will impact on the generator.

For the avoidance of doubt, the DNO does not guarantee any level of duration or frequency of curtailment or constraints. The customer is strongly encouraged to conduct their own assessment of the potential curtailments/constraints and risk associated with an alternative connection.

Post Fault ANM

Post fault ANM is a different form of Constraint Management which can use ANM technology, and is being offered by a number of DNOs following successful trials as part of the Low Carbon Network Fund and other innovation incentives. For Post-Fault ANM, or Constraint Managed Zones, the curtailment assessment used is based on network availability. It is only when the network is not available (for example as a result of fault outage or N-1 conditions) that capacity becomes a constraint. Flexible customers, such as Industrial and Commercial demand customers or embedded generators or energy storage providers, who have signed a relevant commercial contract with the DNO, may have their demand or generation curtailed in the event of a fault. This allows the DNO to avoid or

restrict interruptions in the network. This provides a cost-effective alternative to traditional reinforcement.

Participating Group Membership

- Electricity North West
- National Grid Electricity Transmission
- Northern Powergrid
- SP Energy Networks
- Scottish and Southern Energy Power Distribution
- UK Power Networks
- Western Power Distribution

Consultation Questions

We would like to hear the views of interested parties in relation to any of the work described in this document. We would especially welcome responses to the specific questions which we have set out below.

Q1. Is the information outlined in the document be sufficient for the customer to make an investment decision?

Q2. Is the information currently provided by DNOs in a format that enables the analysis to be carried out?

Q3. What is the preferred method of presenting this information to the key decision makers?

Q4. Is the level of risk being accepted by the customer adequately explained and easily understood?

Q5. Does the supplied example of curtailment estimation explain the process sufficiently?

Q6. Are there any other changes that could be made to further facilitate the investment decision?

Q7. Any other comments?

Responses should be received by **Friday, 4th March 2016** and should be sent to: anthony.bivens@energynetworks.org . Unless marked confidential, all responses will be published by placing them on the ENA website: www.energynetworks.org.

Respondents who wish to have their responses remain confidential should clearly mark the document(s) to that effect and are asked to put any confidential material in the appendices to their responses.

Any questions on this document should, in the first instance, be directed to: Anthony Bivens (Anthony.Bivens@energynetworks.org), Energy Networks Association, 6th Floor, Dean Bradley House, 52 Horseferry Road, London, SW1P 2AF.