Methodology for Calculating Distribution Loss Factors for Embedded Generators Greater than 10MW

Document number	SOP 30-22
Issue number	3
Status	Approved
Approver	Jacqueline Bridge
Date of approval	25/02/2015

ISSUE/AMENDMENT STATUS

Issue Number	Date	Description	Author	Approved by
1	7/03/2013	Initial	A Thomaidis M Wickramasuriya	D Postlethwaite
2	25/02/2014	Cessation of ESC Formula 2	T Langstaff	D Postlethwaite
3	25/02/2015	Rebranding	M Cavanagh	J Bridge

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1 Introduction

As a Distribution Network Service Provider, AusNet Services is responsible for calculating site specific Distribution Loss Factors (DLFs) for generators connected to the electricity distribution network with an actual peak generation of over 10MW, as specified in clause 3.6.3 of the National Electricity Rules[1].

1.1 Background

In the past, AusNet Services has used formula 2 from the *"Guidance Paper: Calculation Methodology for Distribution Loss Factors for the Victorian Jurisdiction"* published by the Victorian Essential Services Commission (ESC) on 14 February 2007 ("ESC formula 2") to calculate the site specific DLFs for qualified generators on its network.

Formula 2:

$$DLF = 1 + \frac{Losses}{(Magnitude\ of\ sales - generation\ volume)}$$

However, when the magnitude of sales is approximately equal to the magnitude of generation Distribution Network Service Providers have found that formula 2 provides an impractical value for DLF.

When sales volume equals generation volume the resultant DLF value becomes infinite, which is not an accurate representation of distribution losses and is an unreasonable value for the purposes of the National Electricity Rules.

AusNet Services has ceased its use of the ESC formula 2 and now applies a consistent methodology to all qualified generators connected to its network.

1.2 Methodology

The methodology used for DLF calculations for qualified embedded generators connected to the AusNet Services' electricity distribution network is:

$$DLF = 1 + \frac{Annual\ Network\ losses\ without\ generator - Annual\ Network\ losses\ with\ generator}{Annual\ generation\ volume}$$

[1] A copy of the National Electricity Rules can be found at the Australian Energy Market Commission's website: http://www.aemc.gov.au/Electricity/National-Electricity-Rules/Current-Rules.html

2 Methodology Description

The methodology to be used for calculating DLFs for qualified embedded generators is similar to the approach employed by other Victorian Distribution Network Service Providers, where a marginal loss is applied to ensure the losses are fairly distributed to each generator.

The methodology calculates the DLF using the difference in the network losses without the generator operating and the network losses including the generator operation and then divides by the volume of generation.

This value is calculated for each operating scenario and then volume weighted by the generator's production during that scenario compared to its annual production.

This methodology employs the following six steps:

1. Set out the operating scenarios that must be considered for the generator.
2. Calculate the distribution losses both with and without the embedded generator operating. If more than one generator is present on the network, the scenarios must consider the typical operation profile of the other generators. That is, with the other generator operating at normal generation capacity and/or not operating.
3. Calculate the annual generation under each operating scenario of the generator being assessed.
4. Calculate the DLF, using the equation:

$$\boldsymbol{DLF = 1 + \frac{Annual\ Network\ losses\ without\ generator - Annual\ Network\ losses\ with\ generator}{Annual\ generation\ volume}}$$

5. Repeat the above steps for each operational scenario of the network.
6. Volume weight the DLF values based on the generation during each scenario compared to the annual generation volume.