

NOM METHODOLOGY AND EXAMPLES

AVAILABLE CAPACITY CALCULATION

This is a map of ‘firm substation capacity’ (determined by the local reliability criteria), minus the forecast peak demand at the Zone Substation level. Data mapped is for the relevant critical peak season (summer or winter) at each Zone Substation. Where a constraint occurs in both seasons, the season with the largest capacity shortfall over the time horizon is mapped. The values in a year Y are calculated as follows:

$$\text{Available capacity}(Y) = \text{Firm substation capacity} - \text{Forecast peak demand}(Y)$$

Data mapped is for the relevant critical peak season (summer or winter) at each Zone Substation. Where a constraint occurs in both seasons, the season with the largest capacity shortfall over the time horizon is mapped.

Example, Minto ZS (Endeavour Energy Network – Summer constrained)

$$\begin{aligned} \text{Available capacity}(2020) &= \text{Firm substation capacity} - \text{Forecast peak demand}(2020) \\ &= 66\text{MVA} - 70.3\text{MVA} = -4.3\text{MVA} \end{aligned}$$

ANNUAL DEFERRAL VALUE CALCULATION

If a non-network investment can effectively defer investment in upgrading a network asset, then there is a financial benefit to the network associated with that deferral. The annual deferral value (ADV) in year Y in \$/kVAyr is:

$$\text{ADV}(Y) = \text{APD} \times (\text{WACC} + \text{DEPR}) / \text{SR}(Y)$$

Where:

Y is the year for the calculated value

APD is the amount of the investment potentially deferrable

WACC is Weighted Average Cost of Capital (nominal vanilla)

DEPR is the Depreciation Rate (straight line, average weighed lifespan 30 yrs) and

SR is the Support required specified by the relevant NSP in year Y

Note that when the NSP doesn’t provide the support required as a distinct field, available capacity (firm substation capacity minus forecast load in the critical season) is used instead.

Example, Minto ZS (Endeavour Energy Network – Summer constrained)

$$\text{Annual Deferral Value} (2022) = \$20.16\text{m} \times (.0668 + .033) / 14.4\text{MVA} = \$139.2/\text{kVAyr}$$

When DM at the ZS level can also potentially defer upstream investments an effectiveness factor (EF) is used to transfer the deferral value from the upstream network asset to the zone substation level. In this case the total ADV of the zone substation is calculated as:

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$$ADV(Y) = APD \times (WACC + DEPR)/SR(Y) + \sum_{\substack{T=\text{upstream} \\ \text{assets}}} EF_T \times ADV_T$$

Where:

EF is the effectiveness factor for the specific zone substation and upstream asset

ADV_T is the annual deferral value of the upstream asset

Example, Doncaster ZS (United Energy Network – Summer constrained)

This is one case where DM at the Doncaster ZS can potentially defer both an investment at the zone substation level and another upstream subtransmission investment. The calculation here is as follows:

$$ADV \text{ subtransmission (2022)} = \$1.5m \times (.0617 + .033)/(114.2 - 93)MVA = \$6.7/kVAyr$$

$$ADV(2022) = \$6.5m \times (.0617 + .033)/(96.5 - 74)MVA + 1 \times \$6.7/kVA = \$27.3/kVA + \$6.7/kVA \\ = \$34/kVAyr$$

PEAK DAY AVAILABLE CAPACITY

This map layer shows the available capacity (as a % of asset capacity) for each hour of the peak day in the lowest level of the network with potentially deferrable investment. Three values are shown in this map layer for the year when support is required for first time. At time T in the peak day they are calculated as follows:

$$\text{Available capacity}(T) = \text{Forecast peak load}(T) - \text{Firm substation capacity}$$

$$\text{Available capacity \%}(T) = 100 \times \frac{\text{Forecast peak load}(T) - \text{Firm substation capacity}}{\text{Firm substation capacity}}$$

$$\text{Hourly exceedance share as \% of ann. total}(T) = 100 \times \frac{\text{Forecast peak load}(T) - \text{Firm substation capacity}}{\sum_{\text{whole year}} \text{All exceedance}}$$

Example, Doncaster ZS at 2pm (United Energy Network – Summer constrained)

Here the mapped year is 2019, the summer forecast load is 95.7MVA, the asset capacity is 74MVA, the load at 2pm in the peak day is 87MVA and there are 63 exceedance hours which have a summation of 558.4MVA:

$$\text{Available capacity}(2pm) = 87MVA - 74MVA = 13MVA$$

$$\text{Available capacity \%}(2pm) = 100 \times \frac{87MVA - 74MVA}{74MVA} = 17.6\%$$

$$\text{Hourly exceedance share as \% of ann. total}(2pm) = 100 \times \frac{87MVA - 74MVA}{558.4MVA} = 2.3\%$$