

Regarding the Order of steps 7 and 8 in the NYISO's Net Benefit Test and Price Threshold Calculation

The NYISO chose to calculate the elasticity based on the estimated supply curve expressed in terms of heat rate, then convert the threshold point to a power price, based on the projected gas price. This is mathematically equivalent to first converting the heat rate supply curve to a power price supply curve based on the projected gas price and then calculating the elasticity.

The estimated heat rate equation is [1]:

$$[1] \quad \text{Heat Rate} = A + B * MW + C * MW^2 + D * MW^3 + \exp^{(E * MW + F)}$$

The elasticity calculated in terms of heat rates is:

$$[2] \quad \text{Elasticity} = \frac{\frac{\text{Heat Rate}}{MW}}{\frac{d(\text{Heat Rate})}{d(MW)}}$$

Then taking the derivative of [1] with respect to MW, yields:

$$[3] \quad \frac{d(\text{Heat Rate})}{d(MW)} = B + 2 * C * MW + 3 * D * MW^2 + E * \exp^{(E * MW + F)}$$

Hence the elasticity in terms of heat rates is:

$$[4] \quad \text{Elasticity} = \frac{\text{Heat Rate}}{MW} * \frac{1}{B + 2 * C * MW + 3 * D * MW^2 + E * \exp^{(E * MW + F)}}$$

Alternatively, the supply curve could be expressed in terms of price by multiplying equation [1] by the gas price (Gp) for the study month. Hence

$$[5] \quad \text{Price} = G_p * [A + B * MW + C * MW^2 + D * MW^3 + \exp^{(E * MW + F)}]$$

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The elasticity of the supply curve in terms of power prices is:

$$[6] \quad \text{Elasticity} = \frac{\frac{\text{Price}}{MW}}{\frac{d(\text{Price})}{d(MW)}}$$

Then taking the derivative of price (equation [5]) with respect to MW, yields:

$$[7] \quad \frac{d(\text{Price})}{d(MW)} = G_p * [B + 2*C*MW + 3*D*MW^2 + E*\exp^{(E*MW+F)}]$$

Hence

$$[8] \quad \text{Elasticity} =$$

$$\frac{G_p * \text{Heat Rate}}{MW} * \frac{1}{G_p * [B + 2 * C * MW + 3 * D * MW^2 + E * \exp^{(E * MW + F)}]}$$

The G_p terms in Equation [8] cancel out, yielding equation [4].