FERC Order 745 B-C Test:
Two Simple Analytics

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No Forward Contracts

Let: Q_o = load without DR

ΔQ = load reduction (<0) resulting from DR

P_o = LMP without DR

P_1 = LMP with DR

$\quad = P_o (1+(1/\varepsilon) \Delta Q/ Q_o)$ for ΔQ small

ε = supply elasticity

The "cost-effectiveness" test (sic) is that:

$$LoadPayment_1 /(Q_0 - \Delta Q) \leq LoadPayment_0 /Q_0$$

Where:

$\quad LoadPayment_0$ is the total bill paid by load without DR,

$\quad LoadPayment_1$ is the total bill with DR (assume DR is paid LMP)

This test becomes:

$$(P_1 Q_o)/(Q_0 - \Delta Q) \leq (P_0 Q_o)/(Q_0)$$

For small ΔQ. this test reduces to:

$$\varepsilon \leq 1$$

Forwards Change the Test Radically

However, the above assumes no forward contracts.

If the amount of forward contracted power is Q_f, then

$LoadPayment_0 = Q_f P_f + (Q_o - Q_f) P_o$

$LoadPayment_1 = Q_f P_f + (Q_o - Q_f) P_1$

Inserting these into the test yields:

$\varepsilon \leq (Q_o - Q_f)/[Q_o + Q_f(P_f - P_o)/P_o]$

This is likely (but not always) well below 1, unless the LMP is at shortage levels.

E.g., if:

P_f is 20% higher than the spot price, and

70% of the load is forward contracted

ε must be 0.26 or less, or average price to consumers increases.

This test depends on unobservables (forward contract Q's & P's)