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OIR-2021-01 Electrical losses in transmission and distribution

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Alternating Current (AC) circuits are affected by resistance, inductance, and capacitance.

The word "line" does not appear in PUC-ARTICLE 14. Disclosure of Sources of Electrical Generation 398.1-398.6. Loss-adjusted load must be defined as more than line losses in the regulations. Inductance and capacitance losses are known reactive losses. The regulation needs to define reactive losses and include them in Loss-adjusted load calculations pursuant to 398.1. (a) The Legislature finds and declares that there is a need for reliable, accurate, timely, and consistent information regarding fuel sources for electric generation offered for retail sale in California.

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Additional submitted attachment is included below.

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Alternating Current (AC) circuits are affected by resistance, inductance, and capacitance.

An AC circuit that contains only resistance can be treated exactly like a Direct Current (DC) circuit. Losses are caused by internal resistance of conductors of electricity.

Inductance is the opposition of a current to any change. Grid AC changes direction sixty (60) cycles a second, hence inductance becomes of great importance in AC circuits.

Capacitance in a AC circuit is charging and discharging each AC cycle, capacitance behavior is very important.

Transmission, distribution, and loads can contain resistance, inductance, and capacitance.

Demand in a AC circuit is measured in Volt-Amps (VA), energy dissipated in a load is measured in Watts (W). Power Factor (PF) is energy dissipated in the load divided demand ($PF=W/VA$). PF is never greater than 1 (Unity). A PF of 0.5 requires twice the wattage as dissipated, hence losses are equal to wattage dissipated in load.

Retail loads can increase losses in transmission and distribution by causing a increase in demand beyond the energy dissipated by the load. The energy not dissipated in the load is returned to the grid, opposing the grids incoming current. This causes the energy to be dissipated in the conductors between the generation and the load.

Pursuant to 398.6. (a)(4), "Loss-adjusted load" means the total amount of electricity, measured at the utility-scale generation source, that a retail supplier requires in order to provide for retail sales after electrical losses in transmission and distribution.

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