

Energy Efficiency Program Guidelines

Equipment Efficiency Derating

Introduction:

This document provides guidance on how Con Edison accounts for the performance of equipment over time, a process known as "derating." Derating recognizes that equipment like boilers become less efficient as they age. This is an important consideration when evaluating energy savings in projects that involve extended life of existing equipment or early replacement. In these scenarios, derating may be applied over the equipment's life span, up to a maximum derating of 10% the existing equipment's nameplate efficiency.

When calculating energy savings, it's essential to have an accurate baseline for the existing equipment's efficiency. Derating helps this by adjusting the original efficiency rating to reflect the expected performance of the equipment at its current age. This ensures that energy savings calculations are realistic and reliable.

Applicability:

This derating guide applies to the following equipment types:

- **Boilers/Furnaces*, Air conditioners, Heat Pumps, Gas/Electric DHW heaters and electric chillers.**

This guide does not currently include derating factors for fans and pump motors.

*Boilers/Furnaces: building's gas consumption must be verified to confirm that the derating does not exceed the building annual consumption.

How Equipment is Derating:

Nameplate Efficiency of existing equipment affected by retrofit may be de-rated as follows:

$$Efficiency_{derated} = Efficiency_{original} \times (1 - M)^{age}$$

Where:

Efficiency_{derated} = Derated equipment efficiency

Efficiency_{original} = Existing equipment efficiency

- Supported by manufacturer's equipment specification sheets, as built drawings, or existing name plate photos.
- For equipment in which nameplate, as built drawings or specification sheet efficiency is unavailable, [vintage versions of ASHRAE 90.1](#) shall be used as a proxy. The version of ASHRAE 90.1 must correspond to the energy code in place at the time of equipment manufacture.

Age = equipment age

M = maintenance factor

Maintenance Factor	M
Boilers/Furnaces, Air conditioners, Heat Pumps, Gas/Electric DHW heaters and electric chillers.	0.005

Maximum Derating: The maximum derating allowed is 10% of the equipment's nameplate efficiency.

Data-Driven Exceptions: Derating should not be applied if the customer or Participating Contractor provides industry-standard performance testing results that accurately reflect the equipment's existing efficiency.

Savings Limits: Derating should not be applied if the resulting annual savings exceed the building's total annual utility consumption.

Example: A 25-year-old, air conditioner with 11 EER name plate efficiency:

$$Efficiency_{derated} = Efficiency_{original} \times (1 - M)^{age}$$

$$Efficiency_{derated} = 11 \text{ EER} \times (1 - 0.005)^{25}$$

$$Efficiency_{derated} = 9.7 \text{ EER}$$

$$11 \text{ EER} \times 90\% = 9.9 \text{ EER} > 9.7 \text{ EER}$$

Derated Efficiency is capped at 9.9 EER