Table of Revisions/Changes

Revision Number	Addition/ Revision	Issue Date	Effective Date	Measure	Description of Change	Location/Page in TRM
3-24-9	Removal	3/29/2024	3/29/2024	C/I Chiller – Cooling Tower	No revisions applied – measure marked for removal from TRM	Pg. 721

Note: Revisions, Additions, Corrections and Removals to the measures listed above were undertaken by the Joint Utilities Technical Resource Manual (TRM) Management Committee between January 8, 2024 – March 29, 2024.

MEASURE RECOMMENDED FOR REMOVAL FROM TRM

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

CHILLER - COOLING TOWER

Measure Description

This measure covers the installation of close approach cooling towers applied to water-cooled chillers used for space cooling. Electric consumption and summer peak coincident demand savings are achieved through the installation of an over-sized cooling tower designed to provide an approach of ≤ 6°F at standard rating conditions. This measure addresses approach temperature only, which is defined as the difference between the cold water temperature (cooling tower outlet) and ambient wet bulb temperature. Changes in condenser water set point control strategies are not included.

Method for Calculating Annual Energy and Summer Peak Coincident Demand Savings

Annual Electric Energy Savings

$$\Delta kWh = units \times tons \times (\Delta kWh/ton)$$

Summer Peak Coincident Demand Savings

$$\Delta kW = units \times tons \times (\Delta kW/ton) \times CF$$

Annual Fossil Fuel Energy Savings

$$\Delta MMBtu = N/A$$

where:

ΔkWh	= Annual electric energy savings
ΔkW	= Peak coincident demand electric savings
ΔMMBtu	= Annual fossil fuel energy savings
units	= Number of measures installed under the program
tons	= Size of cooling system (in tons) being retrofitted with a close approach tower
(ΔkWh/ton)	= Annual electric energy savings per ton of cooling
(ΔkW/ton)	= Electric demand savings per ton of cooling
CF	= Coincidence factor

Summary of Variables and Data Sources

Variable	Value	Notes
tons		From application
(ΔkWh/ton)		Annual electric energy savings per ton of cooling system retrofitted with close approach tower. Look up in Appendix J based on building type, HVAC type and location.

Variable	Value	Notes
(ΔkW/ton)		Electric demand savings per ton of cooling system retrofitted with close approach tower. Look up in Appendix J based on building type, HVAC type and location.
CF	0.8	

Unit energy savings were calculated from a DOE-2.2 simulation of commercial buildings with built-up HVAC systems. The prototype building characteristics are described in Appendix A. The unit energy savings by building type across different cities in NY are shown in Appendix J.

Coincidence Factor (CF)

The prescribed value for the coincidence factor is 0.8.[1]

Baseline Efficiencies from which Energy Savings are Calculated

The baseline condition is a standard cooling tower with a 10°F approach temperature under standard rating conditions.

Compliance Efficiency from which Incentives are Calculated

The compliance condition is a close approach cooling tower with a 6°F approach temperature under standard rating conditions.

Operating Hours

The HVAC system operating hours vary by building type. Operating hour assumptions for the prototypical building models are described in Appendix A.

Example Calculation *(Not to be used as default)*

A close approach cooling tower is installed to remove heat from a 300-ton chiller plant serving a dormitory building located near Albany. Annual Fossil Fuel Energy Savings are not applicable. Annual Electric Energy Savings and Summer Peak Coincident Demand Savings are calculated as below.

$$\Delta kWh = units \times tons \times (\Delta kWh/ton)$$

$$\Delta kW = units \times tons \times (\Delta kW/ton) \times CF$$

units = 1, from application
tons = 300, from application
(ΔkWh/ton) = 6.7, from Appendix J based on building type and location from application
(ΔkW/ton) = 0.003, from Appendix J based on building type and location from application
CF = 0.8, from Summary of Variables and Data Sources table

[1] *No source specified – update pending availability and review of applicable references.*

$$\Delta kWh = 1 \times 300 \times 6.7 = 2{,}010\ kWh$$

$$\Delta kW = 1 \times 300 \times 0.003 \times 0.9 kW$$

Effective Useful Life (EUL)

See Appendix P.

Ancillary Fossil Fuel Savings Impacts

Ancillary fossil fuel savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

Ancillary Electric Savings Impacts

Ancillary electric savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

References

N/A

Record of Revision

Record of Revision Number	Issue Date
1	10/15/2010
12-17-12	12/31/2017
3-24-9	3/29/2024

Return to Table of Contents