

Reducing Data Center Energy and Water Usage Through Passive Radiative Cooling

SkyCool
Systems

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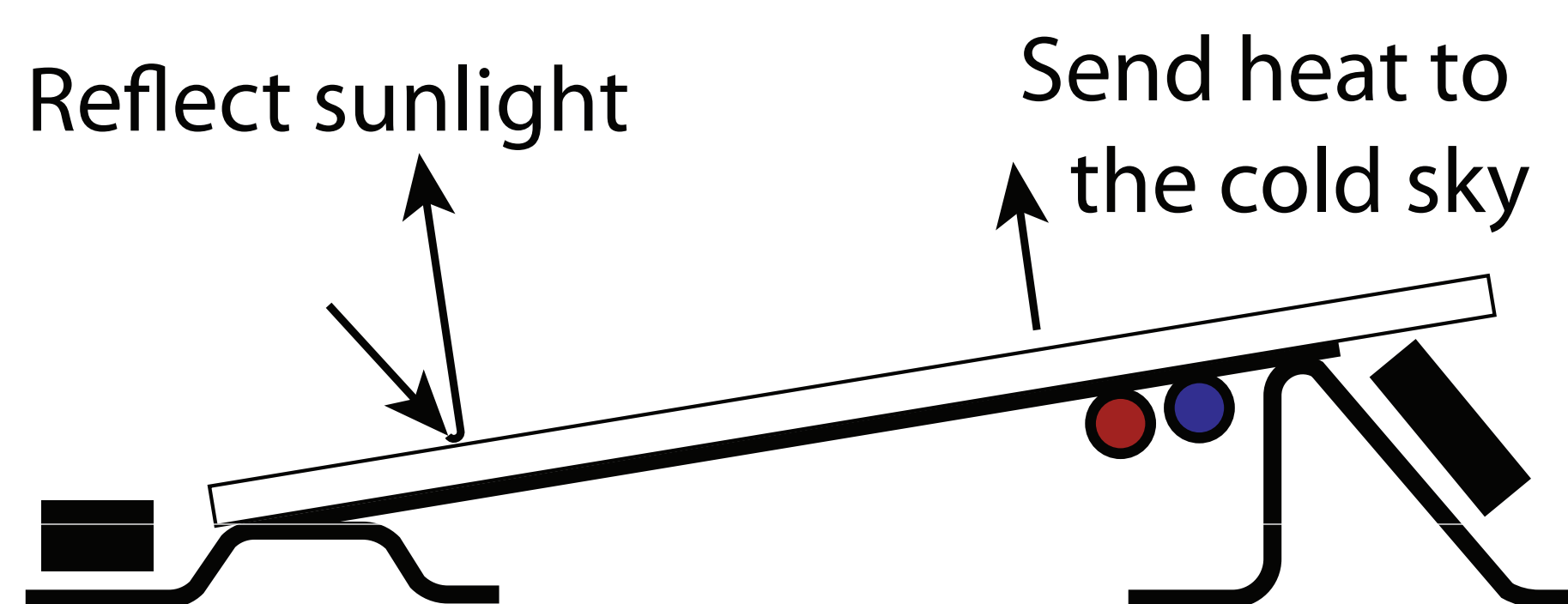
SkyCool Film

Introduction

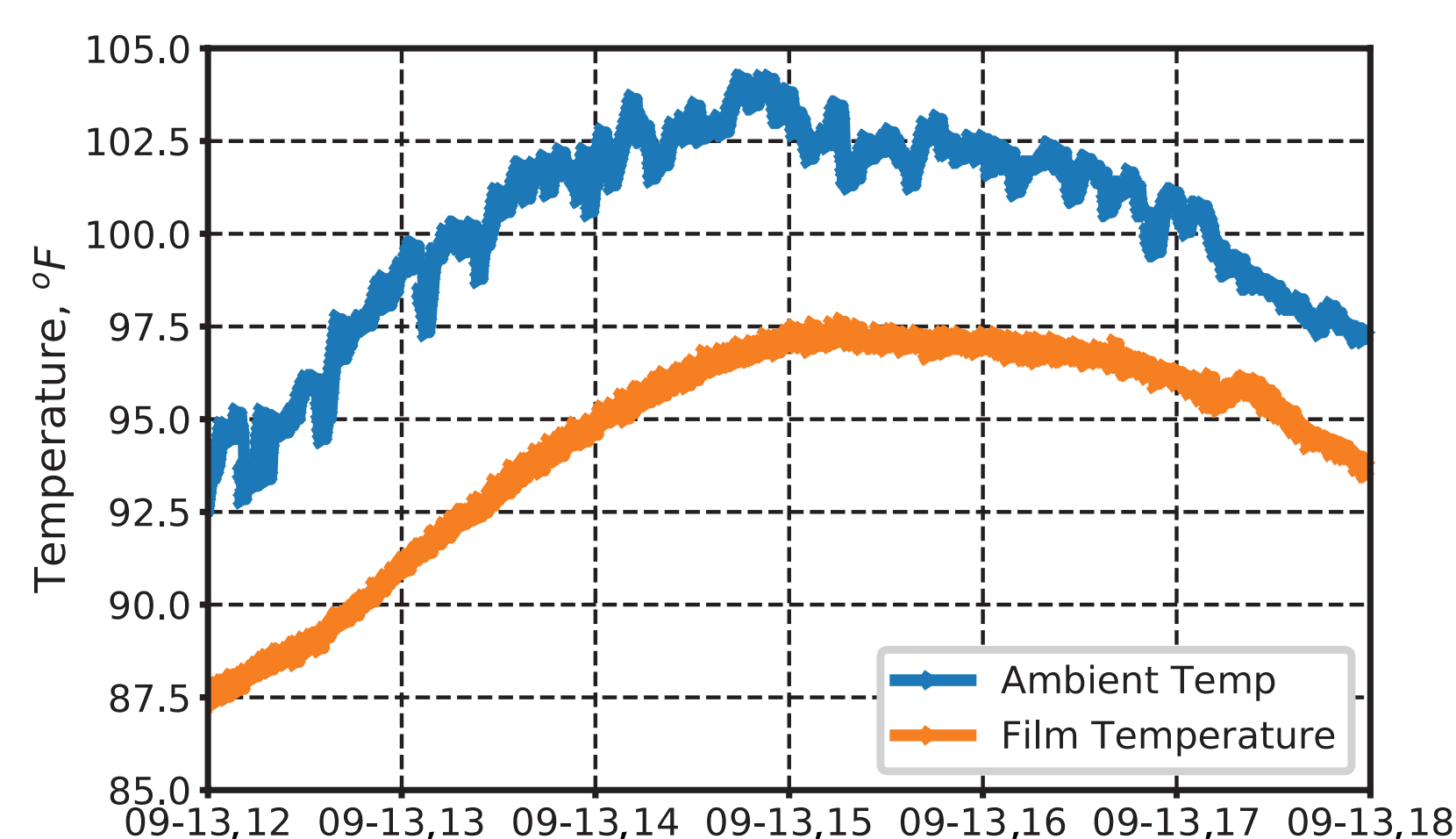
- SkyCool Systems has developed a rooftop cooling panel that passively rejects heat to the sky.
- The cooling effect of the panels is known as daytime radiative sky cooling and the panels require no electricity input* for cooling and have zero evaporative water losses.
- Radiative sky cooling occurs naturally because Earth's atmosphere is partially transparent to infrared thermal radiation (the light wavelengths associated with heat).
- Ancients civilizations utilized radiative cooling to produce ice at night in the desert & cool spaces in buildings.

Film and Panels

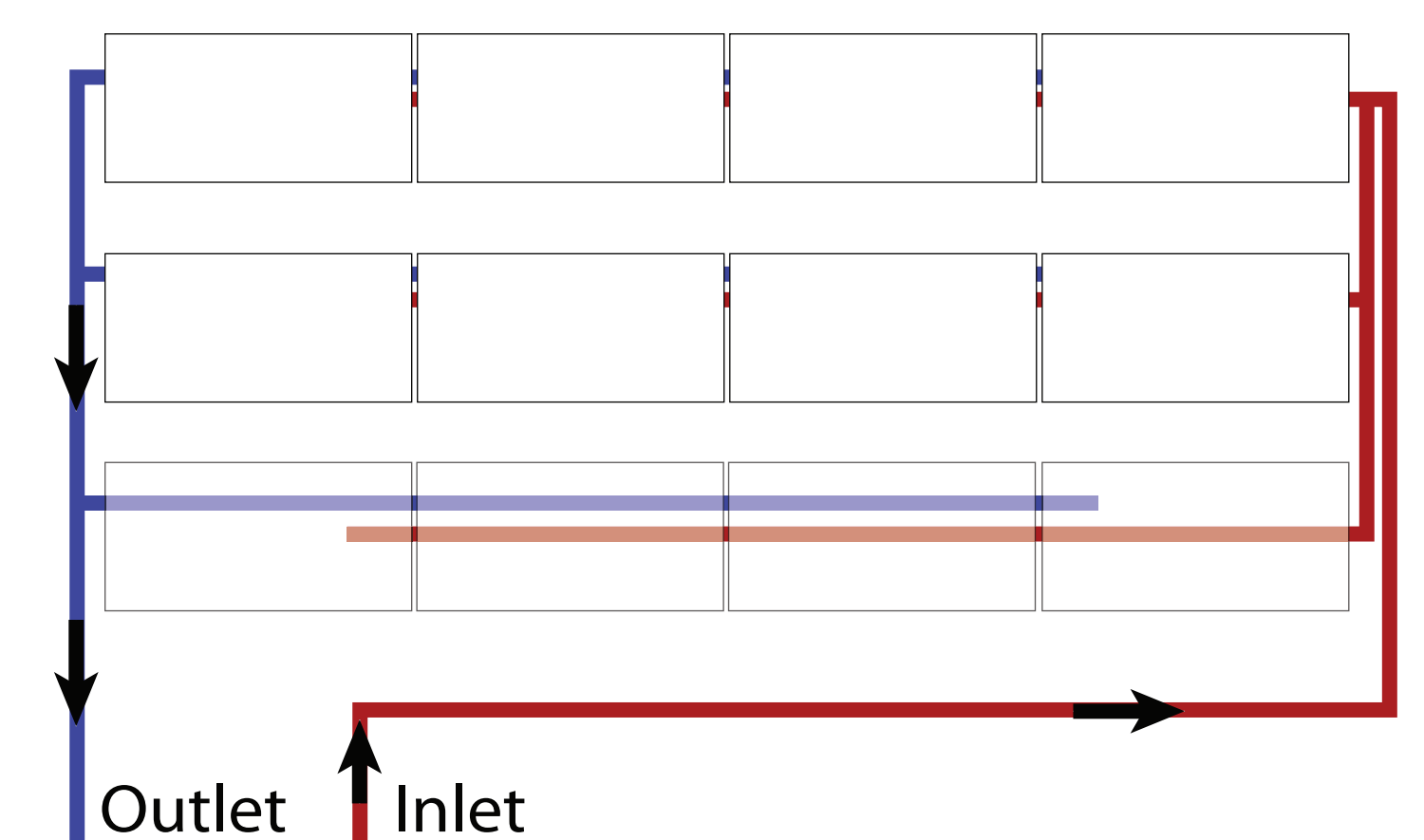
- Daytime radiative sky cooling is enabled by our patented multilayer optical approach, where our films reflect nearly all incident sunlight and emit heat in the 8 to 13 mm wavelength range.
- The cooling effect from our panels occurs all day and is very well aligned with the 24/7 operation of data centers and is most prominent in hot-dry climates.
- Our panels function like solar thermal panels, but cool fluids, and are connected in parallel to meet heat rejection requirements of a space.



SkyCool panels reflect energy from the sun and radiate infrared light to the sky



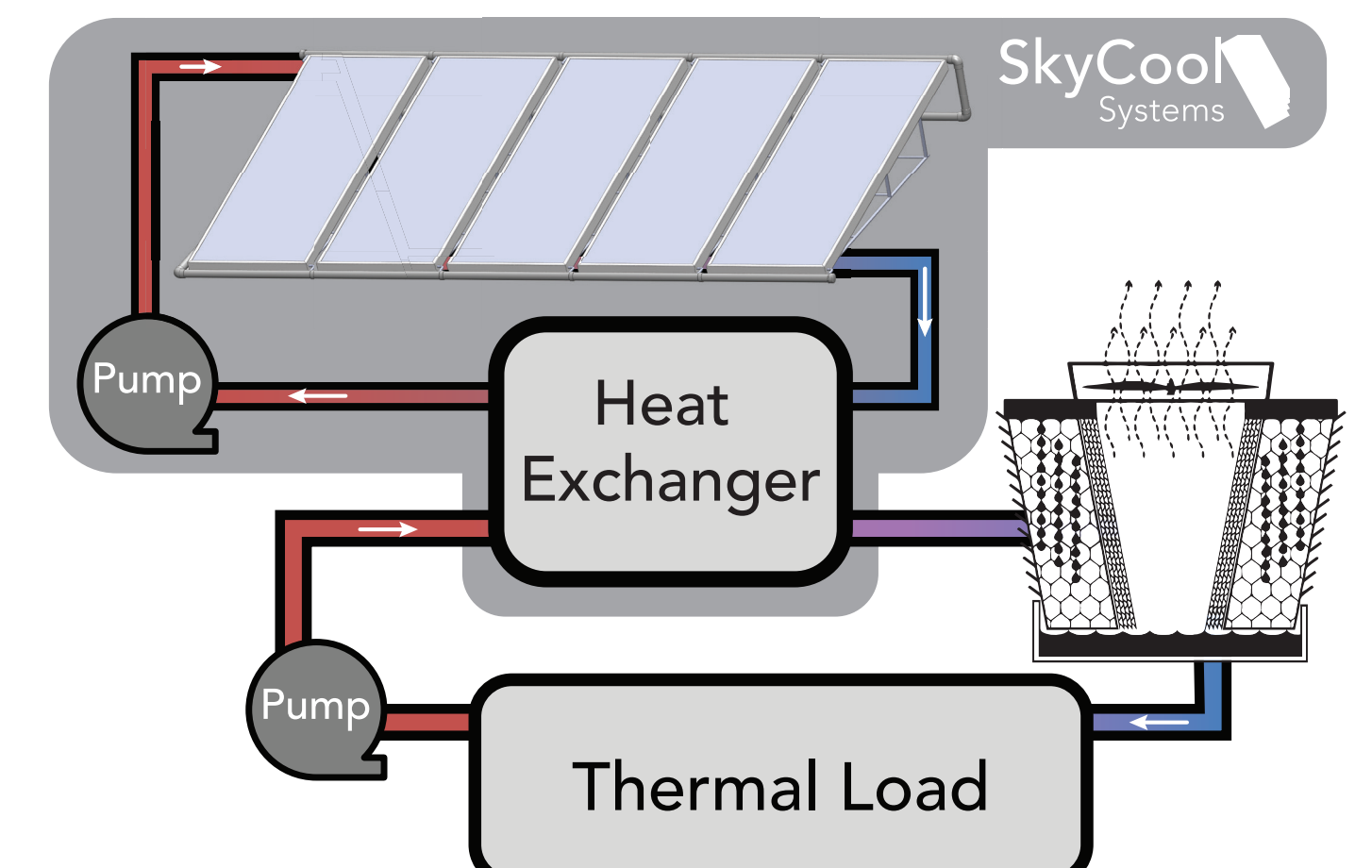
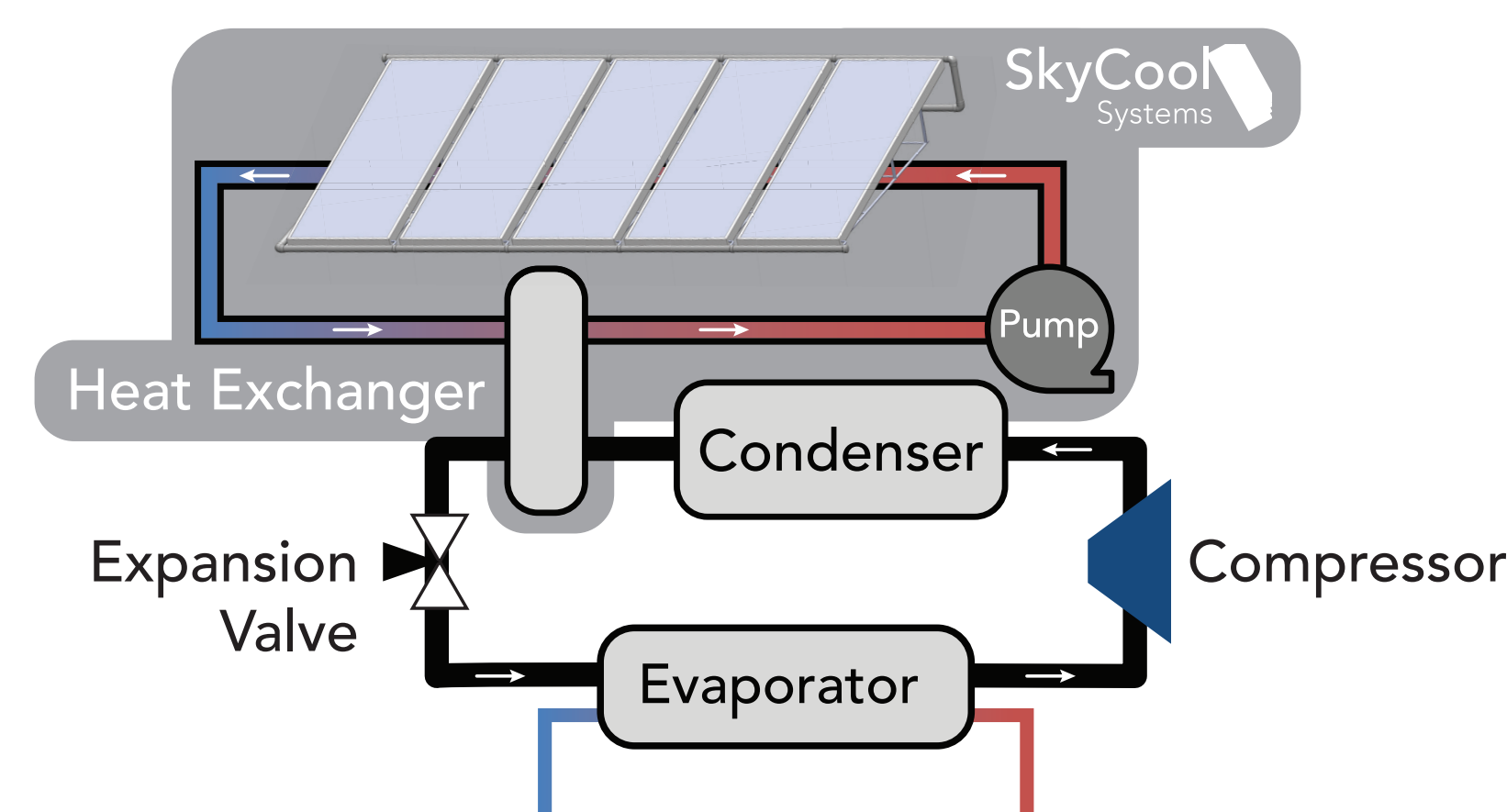
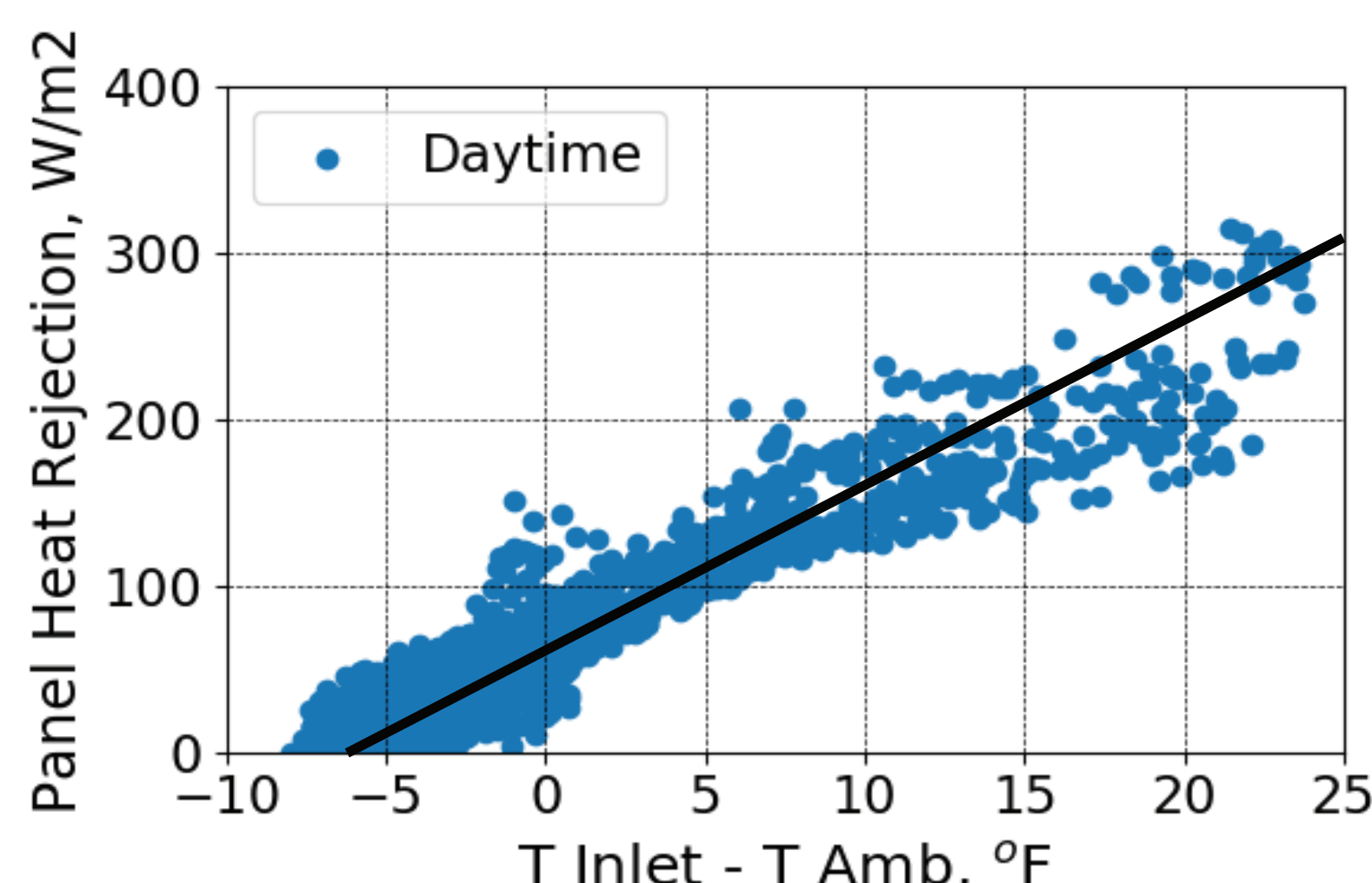
Data taken from rooftop in Mountain View, CA on 9.13.2019



SkyCool panels are connected in parallel to deliver cooling to a load

Approach to Data Center Integration

- Panels can be used to directly reject heat from liquid cooled servers or as an add-on to existing chiller systems.
- Panels can have a very high effective COP** relative to fans or compressors.
- SkyCool is looking to test deployments with data closets and container data centers now.



*the only energy input is for a circulation water pump

** COP is defined as heat rejected to electrical energy input

Acknowledgement

