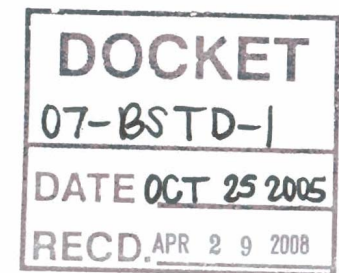


# Inclusion of Cool Ducts in Nonresidential Title 24 Mandatory Requirements

Hashem Akbari  
Lawrence Berkeley National Laboratory

telephone: 510/486-4287  
e\_mail: H\_Akbari@LBL.gov

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# Cool Duct Benefits

**F** Ducts stay cool in sun if they have

- high thermal emittance ( $\geq 0.75$ ) and high solar reflectance ( $\geq 0.7$ )

**F** Cool ducts reduce

- building cooling electricity use
- peak power demand



# Scope

- F** Cool ducts for non-residential buildings
  - New study
  - Both small and large buildings
  - Exposed rooftop ducts
- F** Cool ducts also applies to residential buildings



# Methodology

- F** Review measure availability and cost
  - technologies, market share
  - manufacturers, distribution
  - availability, cost
  - useful life
- F** Perform building cost/benefit analysis
  - evaluate measured energy savings
  - use DOE-2 to simulate cooling and heating energy use
  - net savings = cooling savings - heating penalty
- F** Project state-wide savings



# Measured Data

- F Three systems at California State University, Sacramento; with R6 nominal insulation

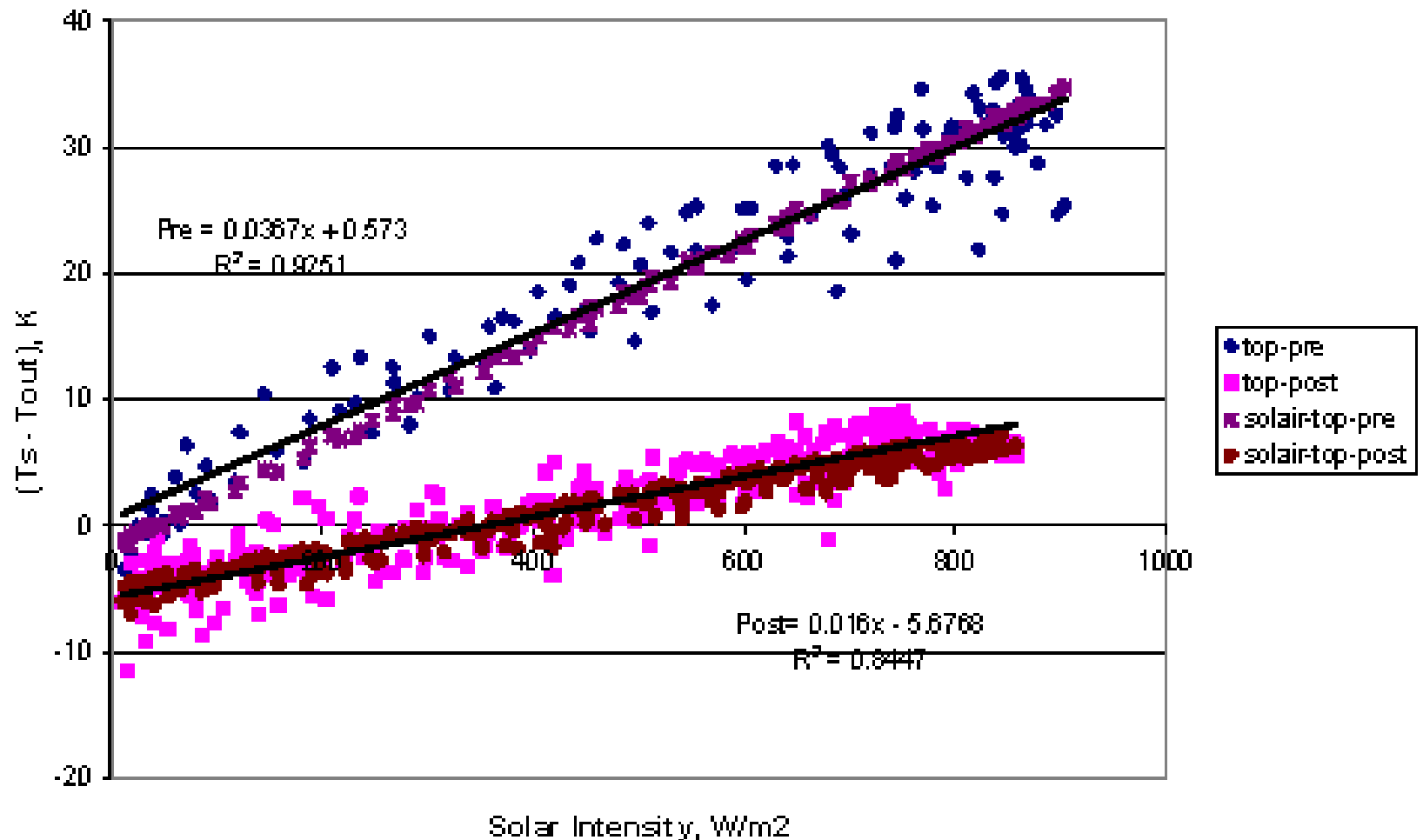


- F Estimated annual savings 5-20 MJ per m<sup>2</sup> of duct surface area (6-13 kWh/m<sup>2</sup>)
- F In new applications, simple payback 2-5 years



# Duct Surface Temperature

Daytime Surface Temperature: Humboldt; Berdahl's sky temp dep



# Air Temperature Rise in the Ducts

Facilities Building: System A

