Inclusion of Cool Ducts in Nonresidential Title 24 Mandatory Requirements

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Cool Duct Benefits

- Ducts stay cool in sun if they have
  - high thermal emittance (≥ 0.75) and high solar reflectance (≥ 0.7)
- Cool ducts reduce
  - building cooling electricity use
  - peak power demand

Scope

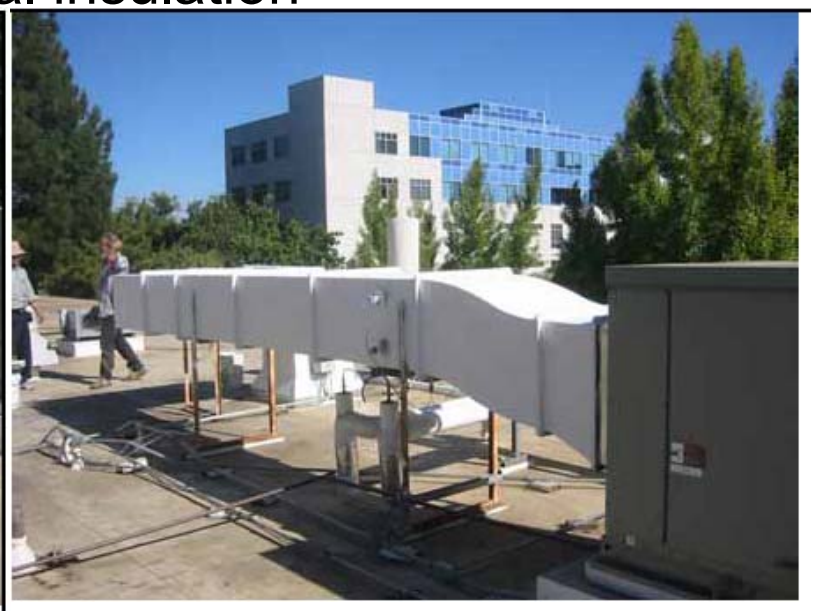
- Cool ducts for non-residential buildings
  - New study
  - Both small and large buildings
  - Exposed rooftop ducts
- Cool ducts also applies to residential buildings

Methodology

- Review measure availability and cost
  - technologies, market share
  - manufacturers, distribution
  - availability, cost
  - useful life
- 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
- Project state-wide savings

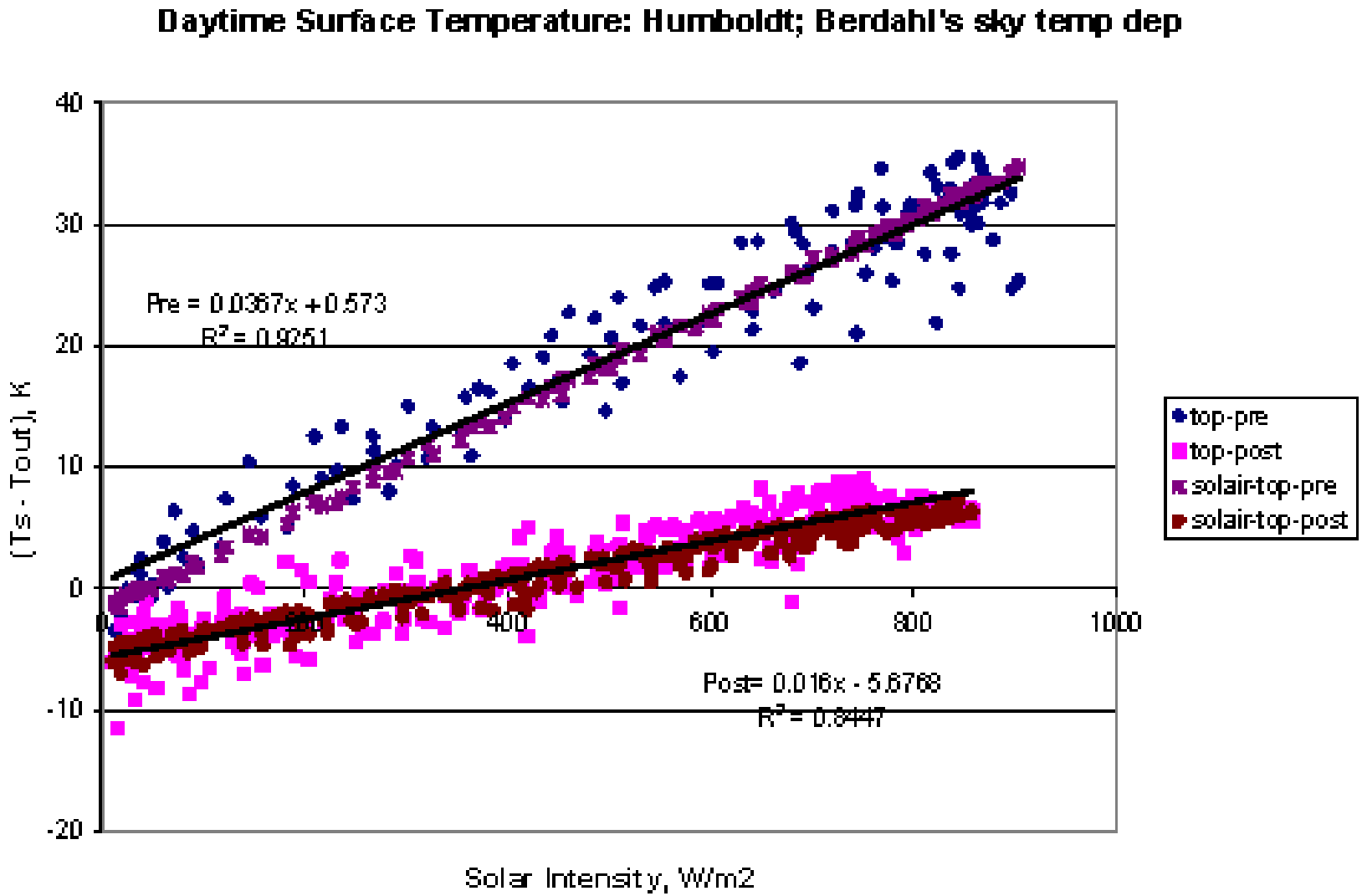
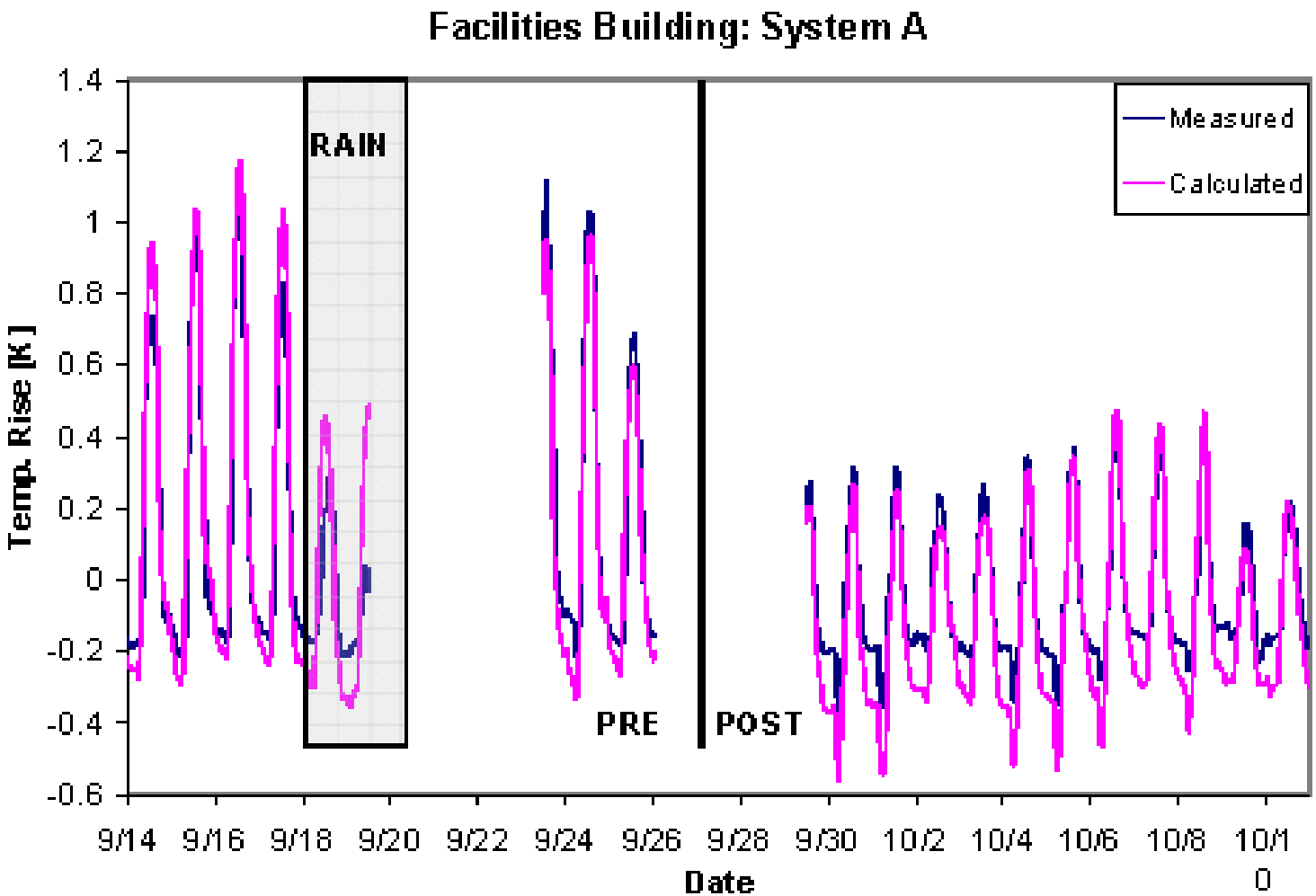
Measured Data

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



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

Duct Surface Temperature



Air Temperature Rise in the Ducts