Are the Lights Really ON? Leveraging a Cost Effective Approach to Estimate Lighting Usage in Nonresidential Buildings

David Gonzales

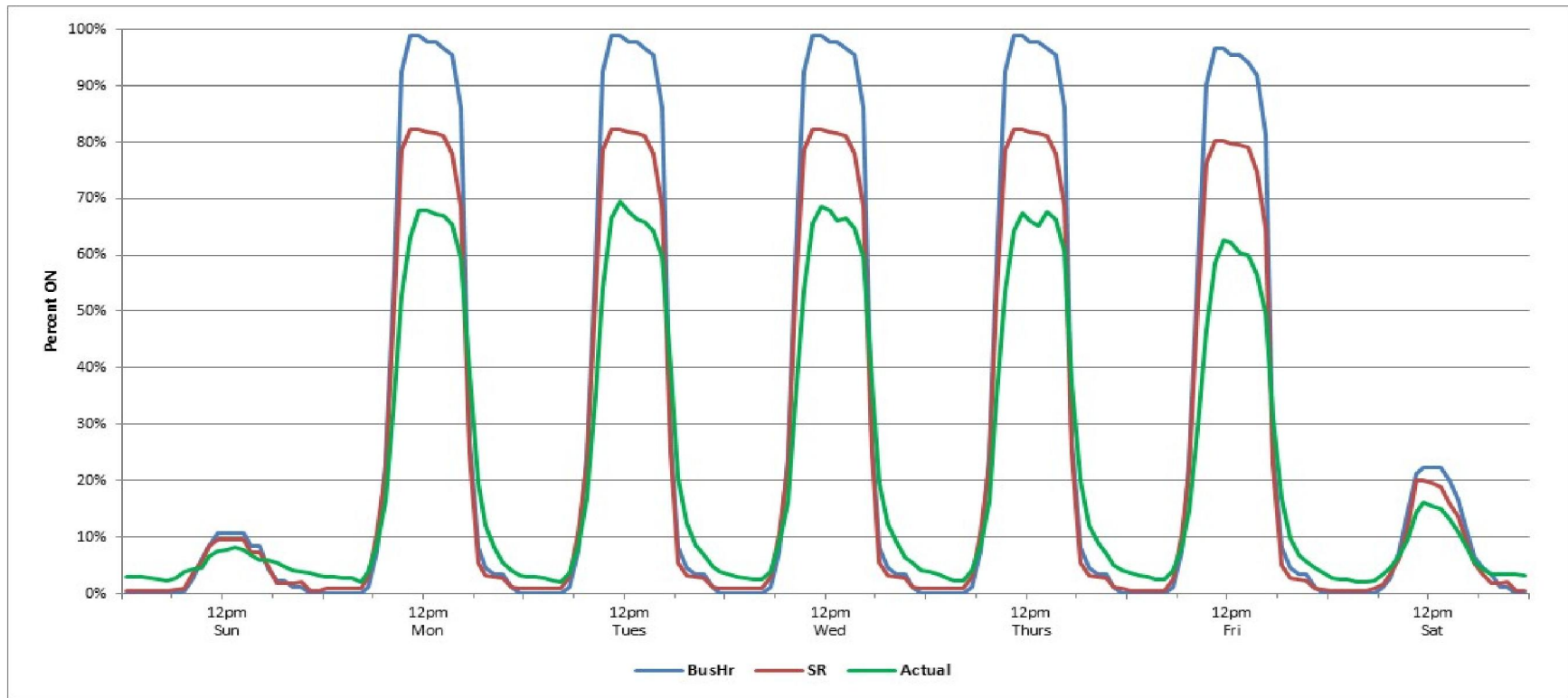**2015 IEPEC Conference — Long Beach, California**

Lighting Load Shapes

How are Lighting Usage Profiles Created?

- ## Lighting loggers
  - Expensive equipment
  - Extensive on-site verification
    - Installation *and* extraction of monitoring equipment
    - Extended period of monitoring time
- ## Alternatives….?

Lighting Load Shapes

Average Weekly HOU for Office Area in Small Offices (Linears)

- How To Best Represent *Actual* Monitored Hours?

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Background

Using Logger Data, Business Hours and Customer Self-Reports to Create Lighting Load Shapes

- ## Method first presented at the 2011 IEPEC conference
  - Based on data collected from 2006-2008 CPUC Small Commercial Impact Evaluation
    - >1,200 on-site visits
      - Business hours collected
      - Self-reported hours of lighting usage collected (by activity area)
    - Logger installation
      - Over 7,000 loggers installed on rebated CFL and Linear measures

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Background

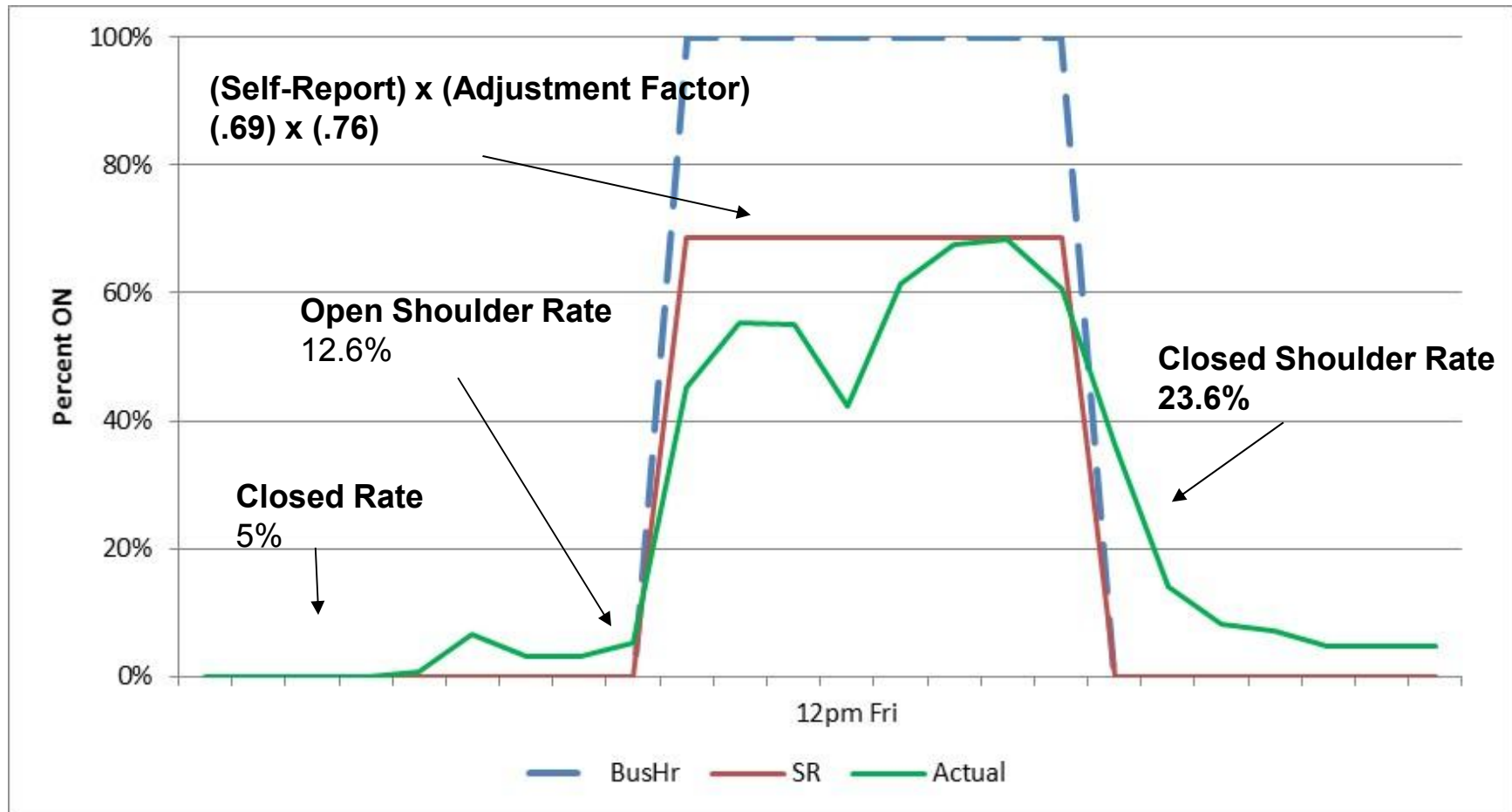How are these results different?

- ## More Data

  - 2010-12 CPUC Nonresidential Downstream Lighting Impact Evaluation

    - \> 800 additional on-site visits

    - \> 4,000 additional logger installations

    - Additional building types and activity areas monitored

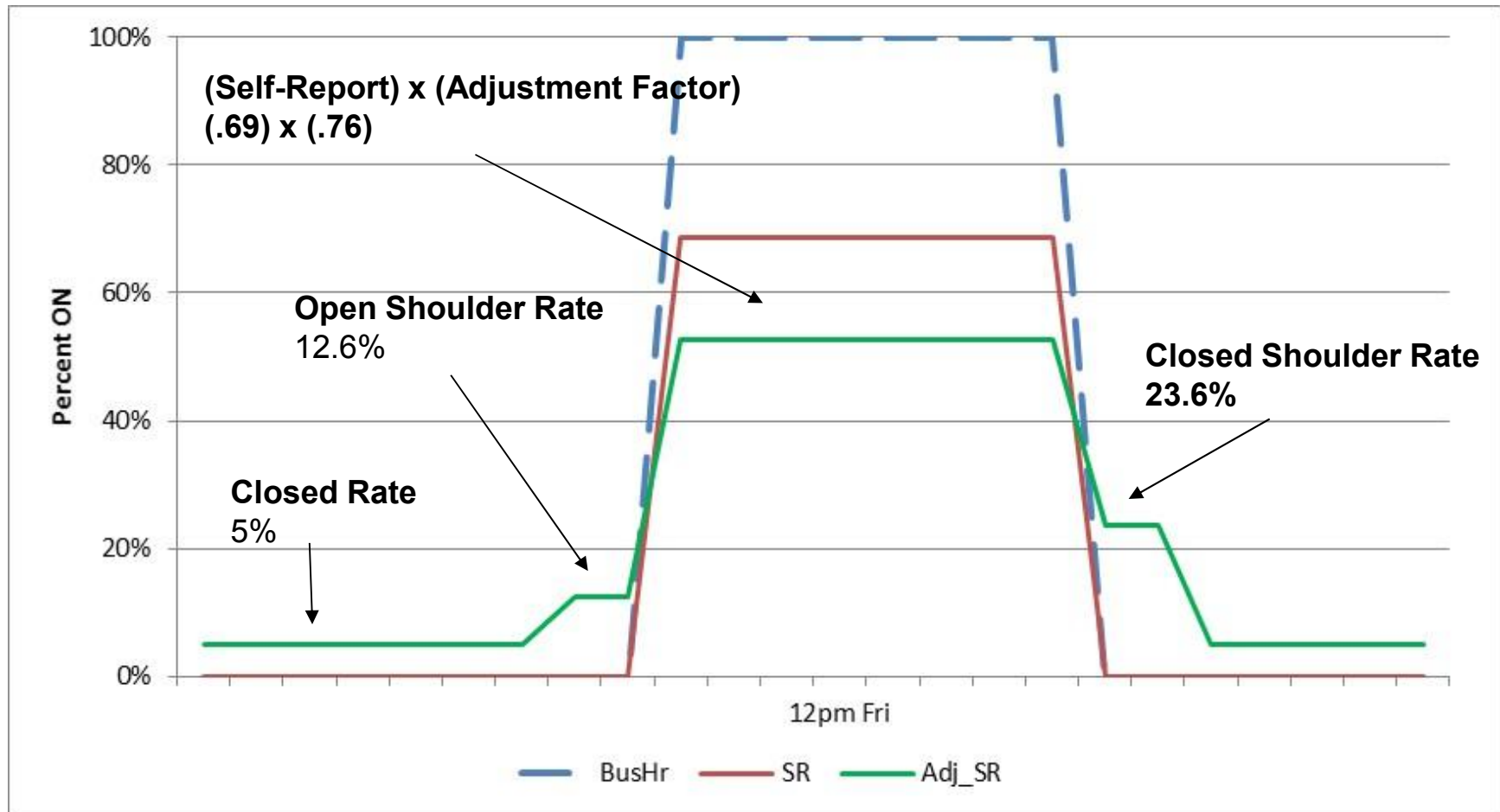   - Includes LED lamps

Development   .59/.78=.76

Application of Adjustment Factor and Business Usage Rates

(Self-Report) x (Adjustment Factor)
(.69) x (.76)

Open Shoulder Rate
12.6%

Closed Rate
5%

Closed Shoulder Rate
23.6%

Percent ON

12pm Fri

BusHr   SR   Actual

6

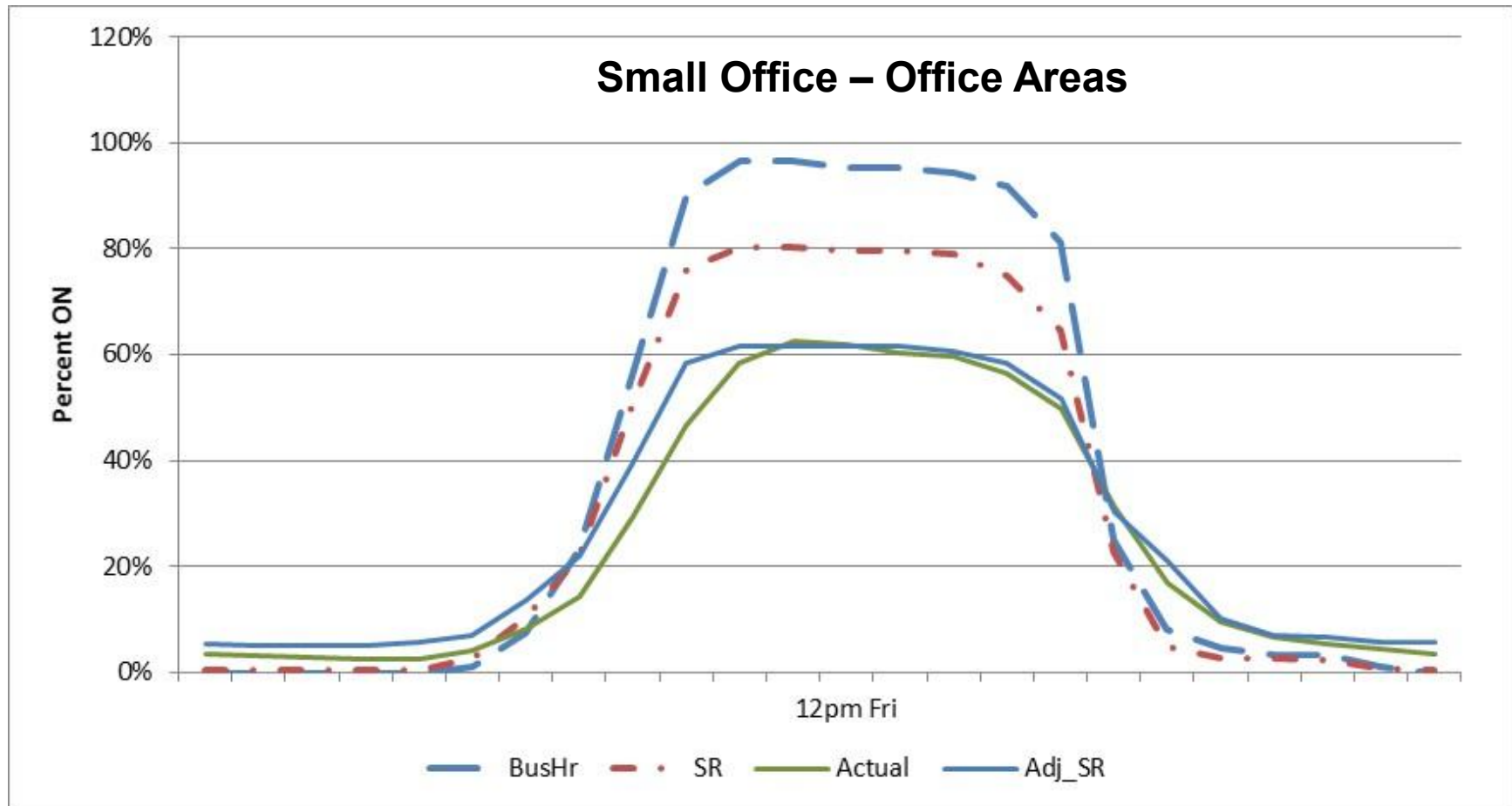# Development *At the Site Level First*

Application of Adjustment Factor and Business Usage Rates

(Self-Report) x (Adjustment Factor)
(.69) x (.76)

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BusHr — SR — Adj_SR
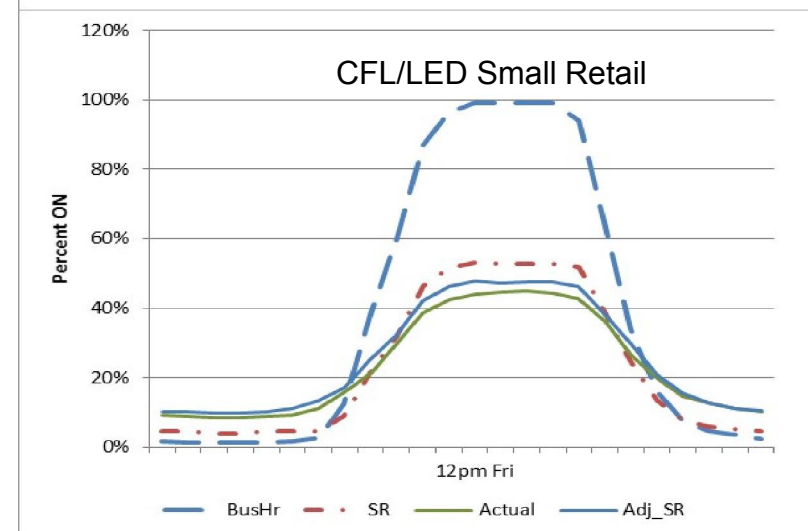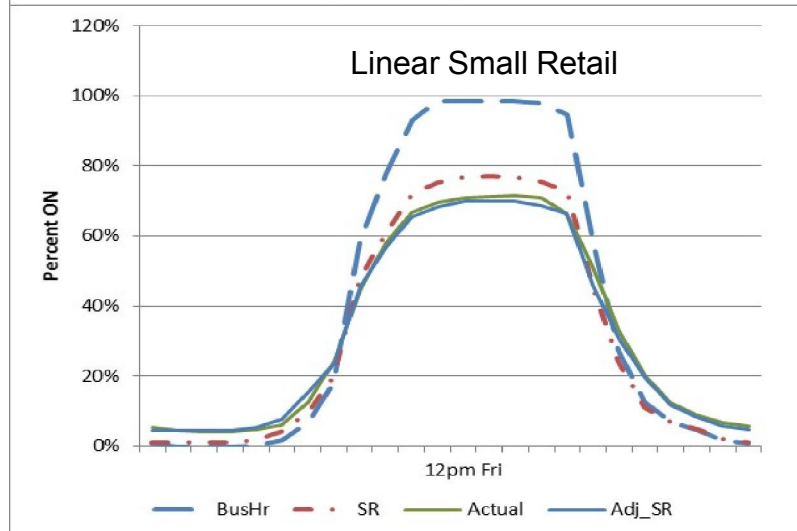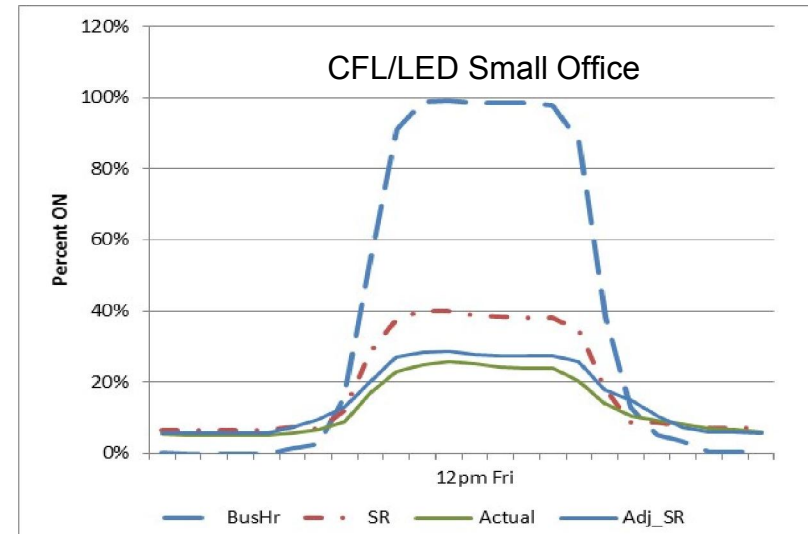
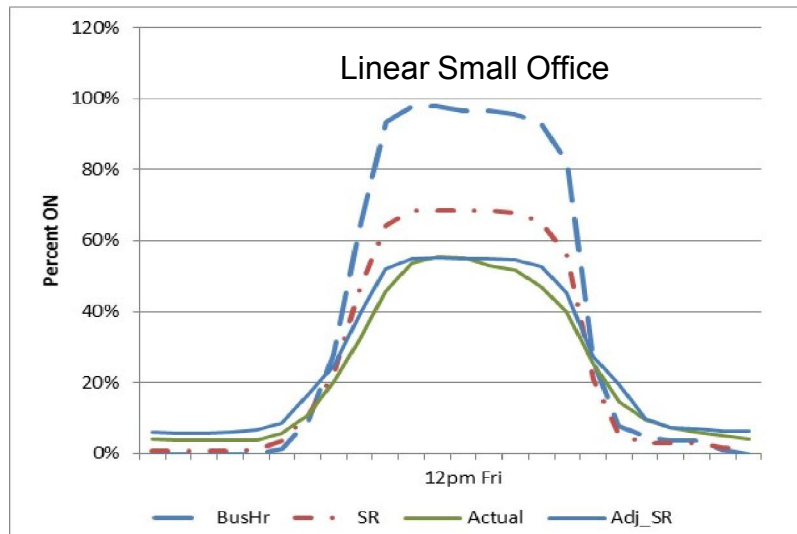Percent ON

7

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Development *Aggregated to the Sample Level*

Application of Adjustment Factor and Business Usage Rates

Results Aggregated to the Building Type Level (All Activity Areas)

Application of Results

- **On-site verification**
  - ☐ Collect detailed business hours
    - Includes seasonal operations and holiday hours
  - ☐ Collect detailed customer self-reported usage
    - Each activity area within the facility
  - ☐ Create hourly bins
    - Open, Closed, Open/Closed Shoulder
  - ☐ Apply adjustments and business hours
    - Site-activity area level *first*
    - Aggregate to the building type level

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Questions?

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