Tier II Advanced Power Strips Study

35th Utility Energy Forum
May 14, 2015

Who is Silicon Valley Power?

- City of Santa Clara's Municipal Electric Utility
- Department of the City
- "Regulated" by City Council
- Established in 1896

Silicon Valley Power staff celebrate the opening of the Donald Von Raesfeld Power Plant.

Who is Silicon Valley Power?

- Located an hour south of San Francisco
- Mediterranean climate
- 19 Square mile service territory
- > 52,000 customers
- ~490 MW Peak
- 70%+ Load Factor
- 1% of California's power usage

Residential Programs

- Standard prescriptive rebates (LED lighting Energy Star® appliances, etc.)
- Free in-home energy audits
- PV system rebates
- Direct install program for low income customers
- Financial & medical rate assistance programs
- Energy information & education programs

Tier II Advanced Power Strips

- Advanced Power Strips (aka “Smart Strips”)
  - Turn off equipment when “master” is turned off
- Tier II Advanced Power Strips (APS)
  - Use IR sensor from remote control to sense activity
  - Turn off controlled loads when no activity
- Questions:
  - Do they save as much as manufacturer claims?
  - Are they cost effective?
  - Will customers like them?
  - Will savings persist?

Photo courtesy of Embertec

APPA's DEED Internship Program

- $4,000 DEED program internship approved
- Recruited college student
  - Selected Brent Kawamura, a senior at Santa Clara University
- 5 month project timeline
  - One month of data gathering per phase

Internship Activities

- Develop outreach materials
- Recruit participants & ensure demographic variation
- Scheduling & installation of Savings Verification System (SVS)
- Participant education
- Removal of SVS & installation of Tier II APS
- Survey of participants
- Data analysis & reporting

Image courtesy of Embertec

Project Partners & Intern Mentorship

- Embertec™
  - Provided use of SVS units and free Emberplugs for trial
  - Pulled data from SVS units
- Energy & Resource Solutions
  - Energy Engineers under contract to Silicon Valley Power
  - Assisted intern with data analysis
- Silicon Valley Power
  - Worked closely with intern on project

Participation

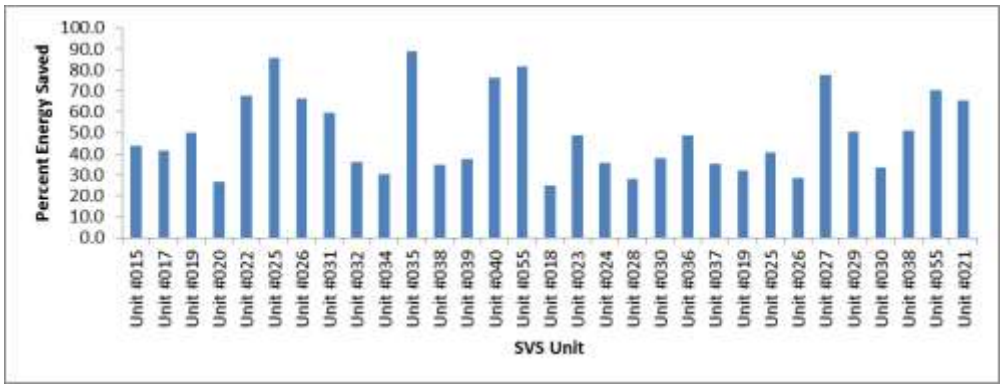
- Goal of 50 households across various demographic sectors
  - Sent over 400 invitations
    - Random number generator used to create mailing list
  - Achieved 36 participants due to installation challenges
  - 2 data sets thrown out due to lack of interaction with device
  - As compensation, participants allowed to keep Emberplugs

Challenges

- More peripheral devices than outlets on the Emberplug
  - Left rarely used peripherals unplugged or plugged into nearby outlets
- Televisions mounted to the wall; no room for Emberplug
  - Unable to participate
- Remote controls with no IR signal
  - Unable to participate

Findings

- Average of 49.5% energy savings
  - Consistent with percentage of savings claimed by manufacturer
- Average annual savings of 163.9 kWh
  - Manufacturer claims 486 kWh in annual savings
- 3.67 year payback
  - Based on average rate of $0.10/kWh and retail price of $60



Findings – User Satisfaction

- 60% of users felt it was effective due to falling asleep or leaving the room
- 66.7% gave rating between 6-10 (on 10 point scale) for continued use
- 71.4% rated between 6-10 for user satisfaction
- Some comments on nuisance of flashing light, dislike interacting with remote instead of phone app, etc.

Energy Savings - Caveats

- Other utilities utilizing the energy savings determined in our study should consider the following:
  - Population demographics
    - Age, household size, number of people home all day, entertainment system components, etc.
  - Climate
    - SVP is located in mild climate where fewer hours are spent indoors
  - State-mandated energy efficiency standards
    - California Title 20

Other Considerations

- CalPlug Study (published May 2014)
  - Estimated between 48%-53% energy savings
    - Lab simulation of home environment using college students
    - Average same percentage as Embertec and SVP studies
  - Based on NYSERDA usage data
    - Took 50% of NYSERDA customer average usage and deemed 346 kWh savings per year

Other Considerations

- SDG&E Emerging Technologies Program Study (Published April 2015)
  - 42 participating households
  - ~ 50% energy savings; 234 kWh/year deemed savings
  - Found 32% savings (134 kWh annually) in post-installation monitoring
    - Small sample of 9 households with usable data
  - 78% customer acceptance rate
  - Cites other studies with deemed savings of 250-350 kWh

Savings Claim Recommendations

- Select a deemed savings value based on what most closely matches demographics

or

- Verify average entertainment system usage in service territory and claim 32% - 50% savings.
  - Use of Kill-A-Watt meters; HOBO data loggers
  - SDG&E study suggests*: 1 Watt of controlled A/V equipment power = ~2.44 kWh annual baseline usage

*This correlation in controlled A/V equipment power and baseline usage is based on a small sample and is suggested as a way to "potentially simplify the development or evaluation of a Tier 2 A/V program."

Program Recommendations

- Recommended for direct install utility program
  - Screen customers through conversations and energy savings potential
    - Kill-a-watt meter on entertainment system to determine savings potential
    - Understanding of interaction required with device
- Alternative: Rebate Program
  - Requires a lot of educational outreach
  - Anticipated lower persistence of energy savings based on user satisfaction survey results

Thank you,

Questions?

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CITY OF SANTA CLARA

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