



Southern Colorado Sustainable Community Conference

Nov 20, 2008





The Greening of a small business

The Colorado Springs Independent





Who is the Colorado Springs Indy?

- A locally owned and operated newspaper with 32 employees, 68 part time employees and with an attitude.
- Located in a historic building, the main part built in 1912.





The Building Construction

- Construction type is heavy mass brick walls between 16 and 24 inches thick
- Wall R-value estimated between 4 and 6
- Roof is pitched 27 ° facing South
- Brick office area added on East side circa 1950
- Windows are single pane with wood frames, many in poor condition





The Heating System

- Low pressure steam boiler for heat source. Outside thermostat to hold boiler off in warm weather.
- 1 air handler to provide warm air heat to the main office area. No thermostat.
- Radiators in each room in the office addition. 1 thermostat in the hallway.





The Cooling System

- Large swamp cooler blows cool air in high up in the main office area.
- 6 window A/C units in the office addition.





Steps taken to reduce carbon footprint

- Formed a Green Team
- Recycling
- Reduce energy consumption
- Install renewable energy
- Encourage alternate transportation
- Reduce water consumption





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Formed a Green Team





Formed a Green Team

- This is an important step because one individual cannot successfully implement the program alone.
- Typically a team of 5-7 people is most effective, depending somewhat on the size of the organization.





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Recycling





Recycling Program

- Set up collection center for recycling standard materials:
 - plastics 1-7
 - aluminum/tin
 - paper and cardboard
- An employee has volunteered to collect compostables and compost them himself.
 - Coffee ground
 - Apple cores
 - Egg shells
- Batteries





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Reduce Energy Consumption





Steps Taken to Reduce Energy Consumption

- Had a free energy audit performed by Springs Utilities.
- Hired a local outside expert (me).
- Benchmark energy use to similar facilities.
- Determine cost effective Energy Conservation Measures, ECMs
- Implement ECMs
- Monitor and verify savings





Perform Energy Audit (Springs Utilities)





Perform energy audit (Springs Utilities)

- Springs Utilities performed a free energy audit
- The report generated from the audit provided a basis for the energy reduction program
- A local Certified Energy Manager (me) was hired to review the report and assist with implementation



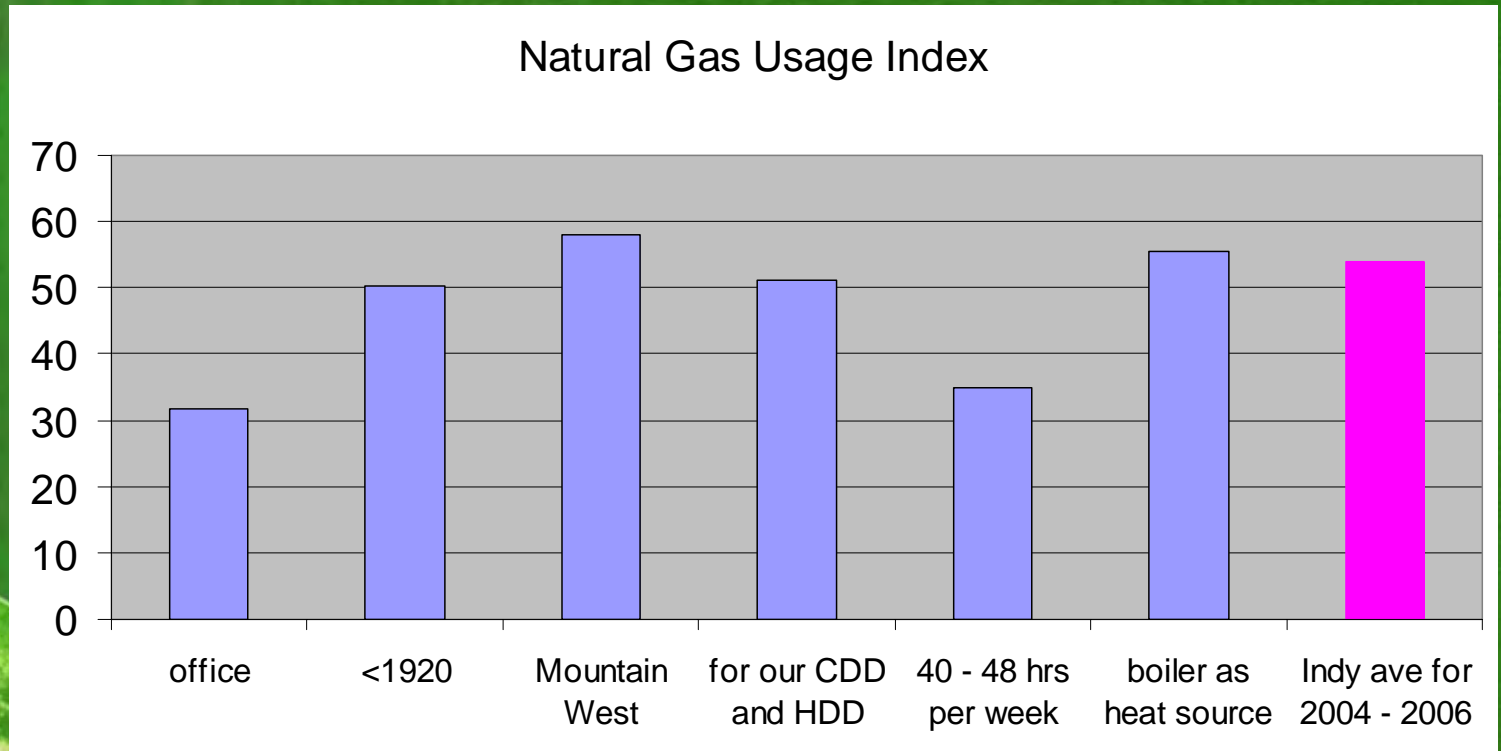


Benchmark Energy use to Similar Facilities.





Benchmark Natural Gas Energy Use to Similar Facilities

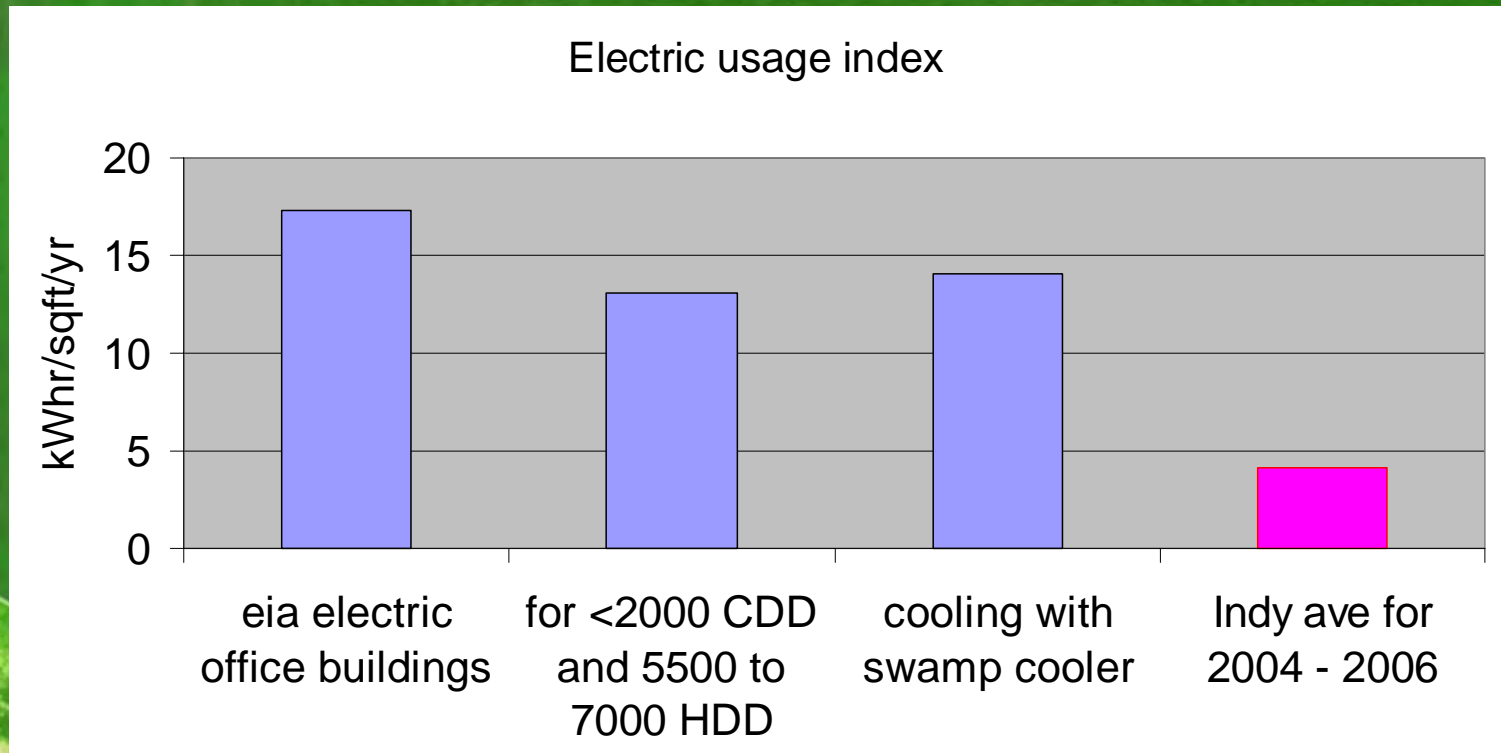


Energy Information Administration

2003 Commercial Buildings Energy Consumption Survey



Benchmark Electrical Energy Use to Similar Facilities



Energy Information Administration

2003 Commercial Buildings Energy Consumption Survey



Conclusions from Benchmarking

- Gas consumption is near the high end of the range for similar buildings
- More focus on saving natural gas
Electrical consumption is low compared to other similar buildings
- Not much potential to save additional electricity
- Renewable electrical energy may make sense for reducing utility electric





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Determine Cost Effective ECMs





Natural Gas Energy Conservation Measures (ECMs)

There were more opportunities for Natural Gas with the usage index being high compared with the standard indices.

- Boiler flue damper.
- Weather stripping doors and windows.
- Repair broken windows
- Insulate 200' of steam piping.
- Insulate 100' of domestic hot water piping.
- Install thermostat in place of on/off switch
- Add ductwork and diffuser to distribute heat more evenly





Electrical Energy Conservation Measures (ECMs)

With the Electrical usage index being so low there were not many opportunities to save electrical energy.

- Hibernate or turn off computers when not in use. No cost.
- Install motion sensing light switches in bathrooms.





Electrical Energy Conservation Measures (ECMs) *cont.*

Install solar PV!!!

- The cheapest kWhr is the one you don't use.
- The electrical usage index is much lower than the EIA indices so there wasn't much opportunity to reduce further.
- Solar PV was the next logical step.
- Preliminary investigation showed the roof pitch and orientation were ideal for Solar and shading was not a problem.





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Implementing ECMs





Implementing ECMs

- The weatherstripping and pipe insulation ECMs were completed with employee help on volunteer work Saturdays.
 - Approximately 50 windows were weatherstripped and 6 broken windows were sealed and caulked.
 - Approximately 100' of domestic hot water pipes were insulated.
 - Approximately 200" of steam pipes were insulated.





Implementing ECMs, *cont.*





Implementing ECMs, *cont.*

- Information and help was provided so employees can put their computers into a low energy mode while away from the desks.
- Motion sensing light switches were installed in the bathrooms.
- Boiler and HVAC work was performed by a qualified contractor.
- The boiler flue damper is planned to be completed by EOY.





Implementing ECMs, *cont.*

- This was the 2nd commercial PV system installed under the Springs Utilities rebate program. The Solar PV was installed by the same installer as the 1st commercial system. Even though there had been issues with the first installation, it was felt that the experience would prevent problems in this job. This proved to be true and the installation went flawlessly.





Implementing ECMs, *cont.*

- Since the roof was in need of replacement, the anchors for the PV system were installed at the time of roof replacement. This is better for maintaining the integrity of the roof.
- The pitch of the roof was 27° near the ideal pitch of 30° so the panels are installed directly on the roof.
- 24 Sharp panels rated for 187 watts were installed for a total capacity of 4488 watts.
- System began operation March 21, 2008





Implementing ECMs, *cont.*



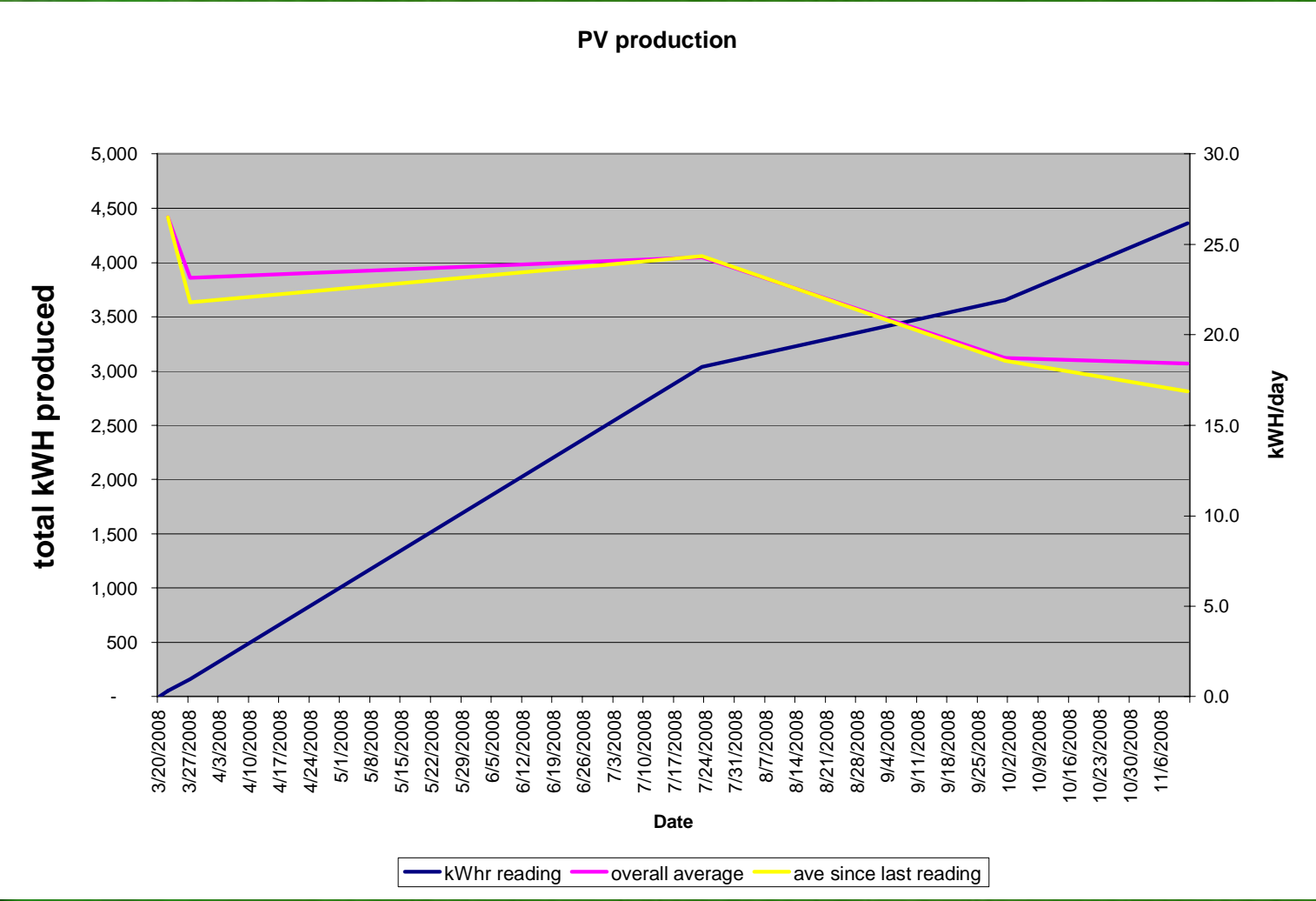


Monitoring and Verification





Solar PV Production





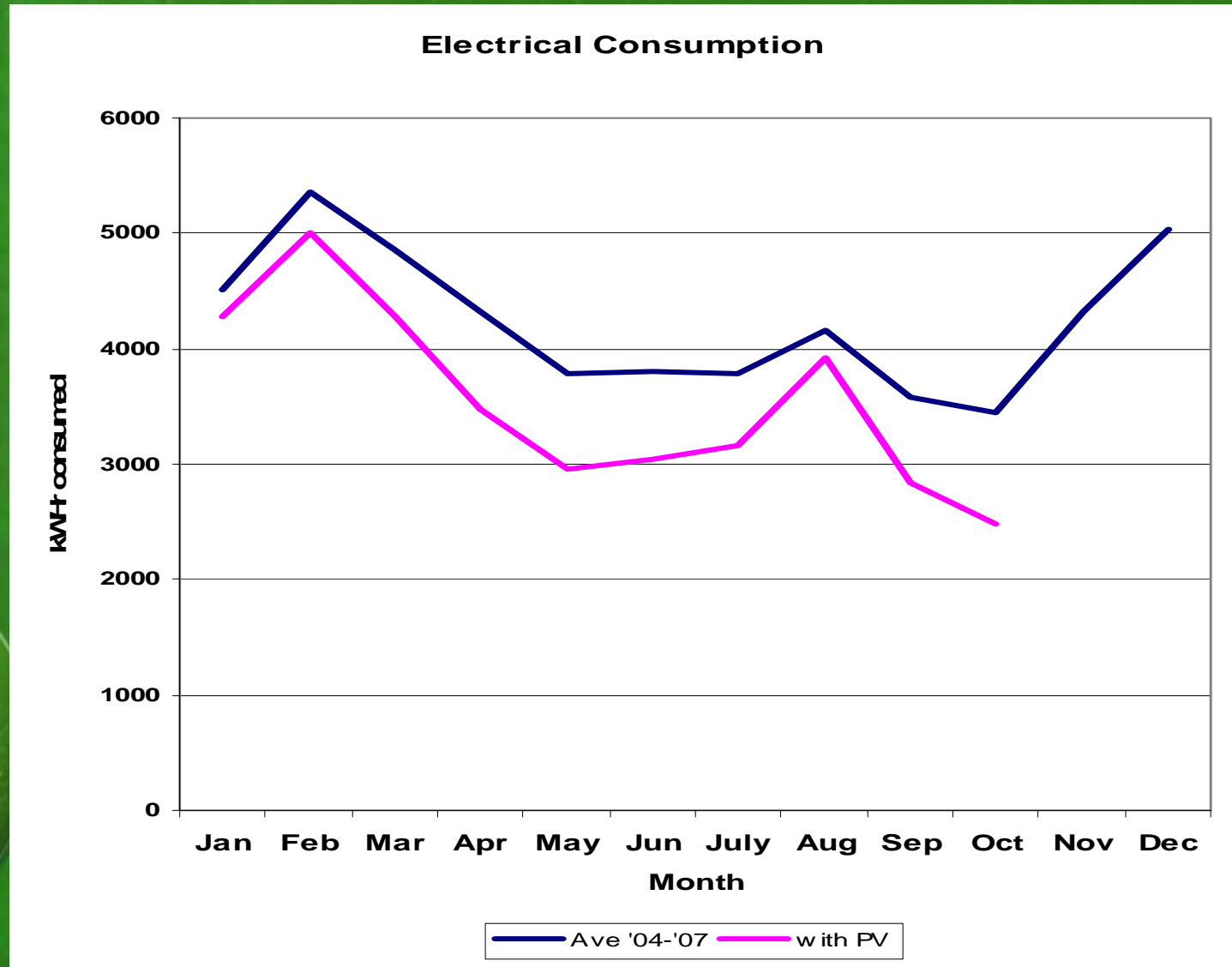
Solar PV Production, *cont.*

- As of July 23 production was approx. 20% above projection.
- As of Nov 12 production was approx. 8% below projection.
- The next slide will show that production in the month of August was likely very low. I do not know if this was simply cloud cover or an operational issue.





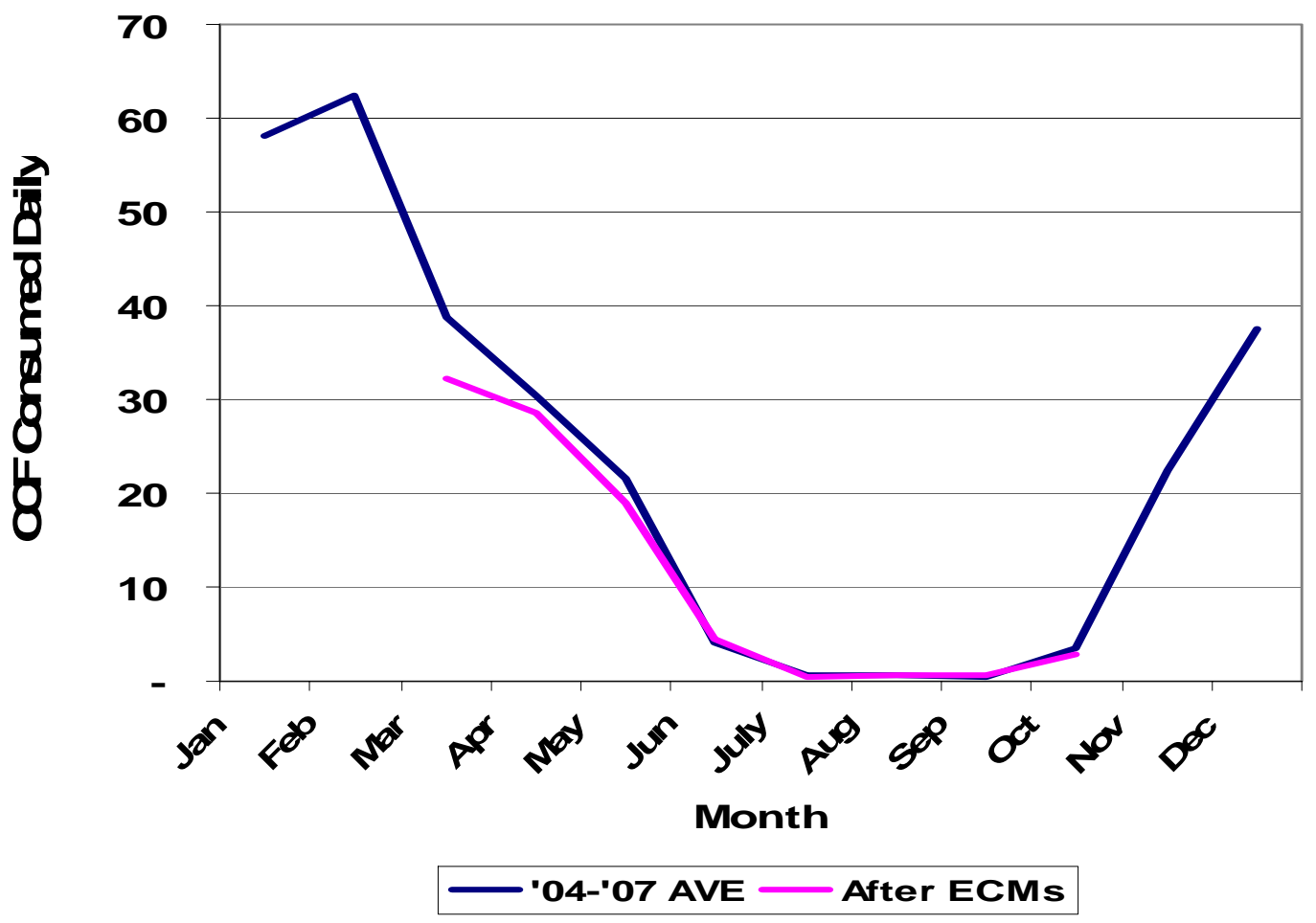
Electrical Consumption before and after





Natural Gas Consumption before and after

Natural Gas Comparison





M&V conclusions

- The PV has provided a significant reduction in electrical consumption from the utility.
- The natural gas savings measures were not completed until the end of March so the data for the coldest months and therefore most savings potential have not yet occurred.





Encourage alternate transportation





Encourage alternate transportation

- 3 of the 32 full time employees pedal to work on a regular basis.





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Reduce water consumption





Reduce water consumption

- A project to install 1 waterless urinal in the men's room and 2 low flow toilets, 1 in the men's and 1 in the women's room is scheduled for completion by the end of the year.





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Conclusions





Conclusions

- The Colorado Springs Indy feels good about what they have done for the environment, as they should.
- They have seen a significant reduction in their electric bill due to their investment in PV.
- Renewable energy works.
- More time is needed to determine if the ECMs for reducing natural gas are working.

