

Case Study: County of Sacramento

Technology Seminar – June 23, 2011



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Presentation Overview

- Background
- Summary of ETAP Projects
- Wireless HVAC Controls Projects
 - Department of General Services Building: DART Retrofit
 - Sheriff's Admin Building: WPT Retrofit
- Implementation Considerations



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Background

County of Sacramento Energy Program (EP)

- Created in 1992 to save energy & money.
- Manages 52 County-owned facilities or 3 million sq. ft. Pays \$9 million per year in utility bills. Provides consulting services for other County operations.
- Currently managing 14 Energy Efficiency Projects with a total value of \$5 million.
- Projects are selected based on need, payback, lower or same maintenance and funding source goals.



ENERGY SOLUTIONS

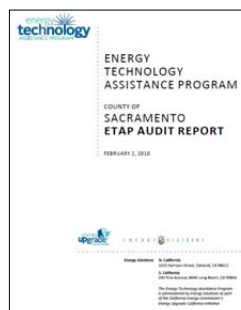
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Summary ETAP Projects

Potential Projects ETAP Evaluated

- Projects Identified
 - Bi-level lighting: 3 garages
 - Wireless lighting controls: 1 buildings
 - Wireless HVAC controls: 5 buildings
- Projects Implementing
 - Bi-level: 1 garage
 - Wireless HVAC controls: 2 buildings



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Bi-Level Lighting at Primary Health Care Garage

Building Information

- 100,000 sq. ft.
- Two levels
- 335 parking spaces



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Bi-Level Lighting at Primary Health Care

Summary of Bi-level Lighting Project

- Replacing 95 fixtures
 - High Performance T8
 - LED
- Installation by In-house labor
- Payback under 5 years

Power Reduction (kW)	10.40
Electricity Savings (kWh/yr)	74,149
Cost Savings (\$/yr)	\$6,697
Net Project Cost (After rebates)	\$32,703
ETAP Rebate	\$12,300
Utility Rebate (estimate)	\$3,367
Payback (years)	4.9



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HVAC Projects - DART and WPT

Why were Projects Selected?

- Want to upgrade HVAC controls of building for better maintenance monitoring
- Reasonable payback
- Pilot project for larger buildings



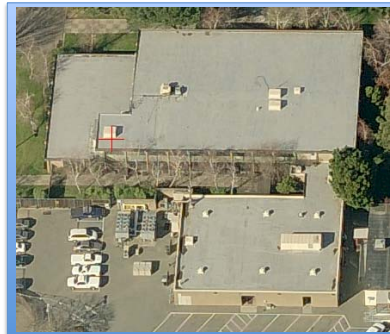
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DART Retrofit at Department of General Services

Building Information

- 31,000 sq. ft., two stories
- Office space
- Pneumatic stats
- Three Air Handling Units: 2 CAV dual-duct, 1 multi-zone
- Two 60-ton air-cooled chillers
- One central boiler



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DART Retrofit at Department of General Services

Vigilent™

Vigilent DART System

- Wireless thermometers feed information into DART's fan control algorithm
- Can monitor and adjust system remotely
- Install in conjunction with VFDs (variable frequency drives)
- Primary energy savings from fans
 - Only circulate amount of air required to achieve desired temperature
- Secondary energy savings from heating/cooling air



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DART Retrofit at Department of General Services

Project Costs and Savings

- 51 zones
- 6 VFDs (3 SF & 3 RF)
- Est. Cost: \$1.24/sf
- Est. Savings: \$0.39/sf

Electricity Savings (kWh/yr)	74,819
Natural Gas Savings (Therms/yr)	1,695
Cost Savings (\$/yr)	\$12,170
Net Project Cost (After rebates)	\$38,523
ETAP Rebate	\$13,467
Utility Rebate (estimate)	\$7,681
Payback (years)	3.2



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DART Retrofit at Department of General Services

Project Benefits & Concerns

- Projected Benefits:
 - Reduced energy costs
 - Allow remote monitor/track space conditions for troubleshooting
 - VFDs will reduce static pressure in ducts
- Possible Concerns:
 - System may not reduce energy costs as much as projected
 - Temperature ctrl may be difficult with two independent systems
 - System may not integrate well with Campus BMS
 - Actual VFD control may not work as well as expected
 - Battery life of sensors may be shorter than estimated



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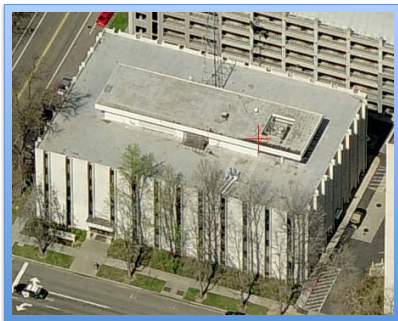
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WPT Retrofit at Sheriff Admin Building

Building Information

- 60,000 sq. ft., four stories
- Office space w/ three 24/7 spaces in building
- Pneumatic thermostats
- One VAV unit for whole building with FCUs for 24/7 spaces
- CHW from adjacent bldg
- One central boiler




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WPT Retrofit at Sheriff Admin Building




Cypress Envirosystems Wireless Pneumatic Thermostats (WPTs)


- Wireless pneumatic thermostats allow for monitoring and adjusting system remotely
- Not installed in conjunction with VFDs (variable frequency drives)
- Primary energy savings from heating/cooling air



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WPT Retrofit at Sheriff Admin Building


Project Costs and Savings

- X Zones
- 2 existing VFDs (1 SF & 1 RF)
- Est. Cost: \$0.90/sf
- Est. Savings: \$0.14/sf


Electricity Savings (kWh/yr)	58,769
Natural Gas Savings (Therms/yr)	1,910
Cost Savings (\$/yr)	\$8,375
Net Project Cost (After rebates)	\$54,360
ETAP Rebate	\$10,578
Utility Rebate (estimate)	\$6,612
Payback (years)	6.5



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WPT Retrofit at Sheriff Admin Building

Project Benefits & Concerns

- Projected Benefits:
 - Reduced energy costs
 - Remote zone setpoint adjustments
 - Allow remote monitor/track space conditions for troubleshooting
- Possible Concerns:
 - System may not reduce energy costs as much as projected
 - System may not integrate well with Campus BMS
 - Product may not be durable enough for environment
 - Battery life of sensors may be shorter than estimated



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Implementation Considerations

Contracting and Procurement


- For small projects (<\$100,000) County is using EP PM, direct procurement of materials and in-house labor for installation.
- For larger projects (>\$100,000) County is using in-house PMs, JOC (job order contracting) for procurement of materials and installation.
- ETAP projects are generally <\$100,000.




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Questions




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Summary ETAP Projects


Cost & Savings of all Projects ETAP Evaluated

Project #	Facility Name	Power Reduction (kW)	Electricity Savings (kWh/yr)	Natural Gas Savings (therm/yr)	Cost Savings (\$/yr)	Project Cost (before incentives)	Total ETAP Incentive	Estimated Utility Incentive	Net Project Cost (after incentives)	Payback (Years)
Bi-level										
1	525 7th Street Garage	21.84	148,453	-	\$14,276	\$121,190	\$34,060	\$8,589	\$78,541	5.5
2	725 7th Street Garage	24.13	173,513	-	\$15,818	\$117,080	\$38,240	\$3,789	\$75,051	4.7
3	4600 Broadway Garage	10.40	74,149	-	\$6,697	\$48,370	\$12,300	\$3,367	\$32,703	4.9
DART										
4	New Administration Building		328,590	6,588	\$41,086	\$279,865	\$59,146	\$32,875	\$187,844	4.6
5	Old Administration Building		161,524	2,053	\$19,307	\$103,490	\$29,074	\$14,975	\$59,441	3.1
6	Department of General Services		74,819	1,695	\$12,170	\$59,671	\$13,467	\$7,681	\$38,523	3.2
7	Agricultural Commission Building		25,061	2,499	\$5,255	\$38,467	\$4,511	\$4,504	\$29,452	5.6
8	Sheriff's Administration Building		47,596	2,785	\$8,021	\$84,650	\$8,567	\$5,593	\$59,490	8.7
Wireless Pneumatic Thermostats (WPIs)										
9	Sheriff's Administration Building		58,769	1,910	\$8,375	\$71,550	\$10,578	\$6,612	\$54,360	6.5
Wireless Lighting										
10	Sheriff's Administration Building - whole building		224,614	-	\$22,461	\$196,740	\$40,430	\$13,477	\$142,833	6.9
TOTAL: All Identified Projects -			1,315,088	17,530	\$153,466	\$1,121,073	\$250,374	\$102,461	\$768,237	6.1



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