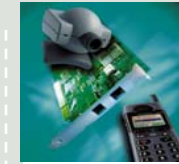


SIEMENS

Siemens Building Technologies, Inc.



achieving beyond the boundaries with ...

performance solutions

Agenda

- **Introductions**
- **The Energy Cost Challenge**
- **The Sustainability Challenge**
- **Energy & Sustainability Solutions**
- **Guaranteed Energy Performance Contracting**
- **Measuring the Results**
- **Summary**
- **Q&A**

Introductions



Introductions

Marc Craddock, CEM

– Energy Account Executive, *Siemens*

The Energy Cost Challenge



The Energy Cost Challenge

Valencia Community College Energy Cost (\$) Per Sq Ft

Campus	2004/2005	2005/2006	%Increase
Downtown	\$ 1.58	\$ 1.95	23%
East	\$ 2.08	\$ 2.65	27%
Osceola	\$ 2.75	\$ 3.20	16%
West	\$ 1.88	\$ 2.31	23%
Winter Park	\$ 1.77	\$ 2.69	52%
Average	\$ 2.01	\$ 2.56	27%

The Energy Cost Challenge

Valencia Community College Total Energy Spend

	\$ Spend	\$ Increase	%Increase
2004/2005	\$ 3,250,000		
2005/2006	\$ 4,150,000	\$ 900,000	28%
2006/2007*	\$ 4,570,000	\$ 420,000	10%
Total Increase		\$ 1,320,000	38%

* 2006/2007 Figures Were Budgetary Numbers for Planning Purposes

The Sustainability Challenge



The Sustainability Challenge

The World in 2006

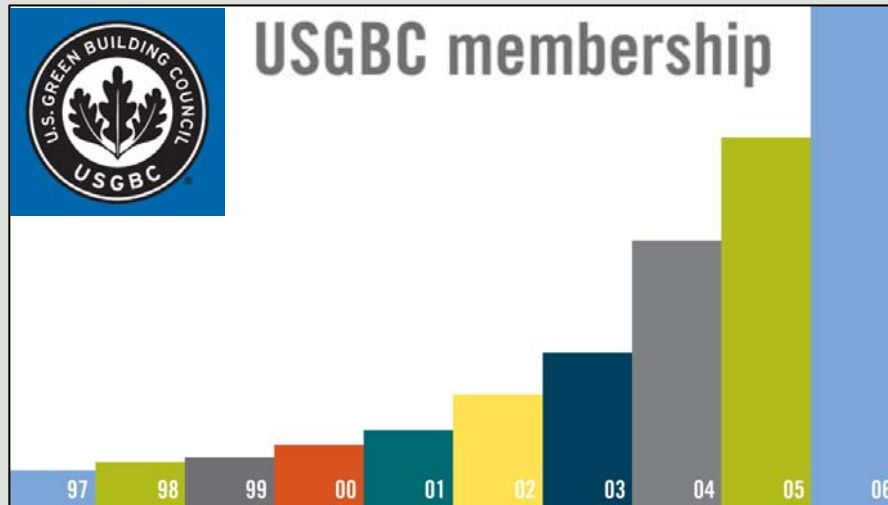
Gas Hits
\$3.00 / Gal.

War in Iraq

Democrats
Control
Congress

An
Inconvenient
Truth

Headline:
Green Building
Goes Big



The Sustainability Challenge



- **Acknowledgement of Concern Regarding Global Warming**
- **Recognition of Need to Reduce Greenhouse Gas Emissions by 80%**
- **Statement of Belief that Colleges & Universities Should Lead in this Effort**
 - **Reduce Global Warming Emissions**
 - **Integrating Sustainability into Curriculum**
 - **Providing Educated Graduates to Achieve Climate Neutrality**
- **Commitment to Develop a Plan for Campus Climate Neutrality**

The Sustainability Challenge



- **Commitment to Develop a Plan for Campus Climate Neutrality**
 - **2 Months – Establish Institutional Structure**
 - **2 Months – Select Tangible Actions**
 - **Green Building Policy**
 - **Energy Smart Procurement Policy**
 - **Green Power Purchasing**
 - **1 Year – Greenhouse Gas Emissions Inventory**
 - **2 Years – Climate Action Plan**

Energy & Sustainability Solutions



Energy & Sustainability Solutions

Lighting Upgrades

- Day-Light Harvesting Pilot Project
- Occupancy Sensor Projects
- Energy Efficient Lighting Upgrades (Electronic Ballast / T8 Lamps)



Water Fixture Upgrades

- Waterless Urinal Pilot Project
- Low Flow Aerator Installation
- Early Leak Detection & Repair Efforts



Energy & Sustainability Solutions

College-wide Recycling Program

- 2007 – Only Mixed Paper Collection
- 2008 – Expanded to Add Cardboard, Aluminum Cans, and Plastic Bottles
- Over 43 Tons of Landfill Waste Diverted

Valencia Recycling Statistics

Month /Year	CARDBOARD	MIXED PAPER	PLASTIC BOTTLES	ALUMINUM CANS
Oct 2008	10,540 pounds	****	****	****
Nov 2008	10,960 pounds	****	****	****
Dec 2008	15,025 pounds	****	10 pounds	5 pounds
Jan 2009	20,755 pounds	7,630 pounds	42 pounds	****
Feb 2009	13,097 pounds	****	45 pounds	18 pounds
Mar 2009	16,500 pounds	520 pounds	39 pounds	26 pounds
TOTAL TONS =	43.44 tons	4.1 tons	136 pounds	49 pounds

Energy & Sustainability Solutions

Establishment of Sustainability Committee

- Review and Recommend Energy Initiatives
- Review and Recommend Sustainability Initiatives
- Guide Integration of Sustainability into Curriculum
- Recommended LEED NC for New Buildings
- Recommended VCC to Become Signatory of Presidents' Climate Commitment



Valdosta State University
Patrick Schloss, President

Valencia Community College
Sanford Shugart, President

Vermilion Community College
Sue Collins, President

Victor Valley College
Robert Silverman, Superintendent/President

Villanova University
Peter Donohue, President

Virginia Commonwealth University
Michael Rao, President

Energy & Sustainability Solutions

Leadership in Energy and Environmental Design (LEED)

- Valencia Commitment on all New Buildings

Energy & Atmosphere

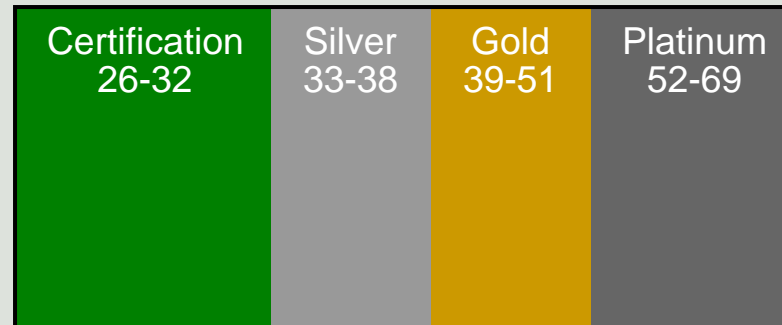
Water Efficiency

Indoor Environmental Quality

Sustainable Sites

Innovation & Design Process

Materials & Resources



Energy & Sustainability Solutions

Leadership in Energy and Environmental Design (LEED)

- Valencia Commitment on all New Buildings
- Three (3) LEED New Construction Projects Completed

Allied Health Sciences Building

- 80,000 Sq. Ft. Facility
- Alternative Transportation Promotion
- Light Colored Reflective Roofing
- 99% of Construction Waste (1,450 tons) Recycled
- Green Housekeeping Products Only
- High Efficiency Chilled Water for Building



Energy & Sustainability Solutions

Leadership in Energy and Environmental Design (LEED)

- Valencia Commitment on all New Buildings
- Three (3) LEED New Construction Projects Completed

Special Events Center

- 17,000 Sq. Ft. Facility
- Natural Area Preservation
- Rainwater Recycling for Use in Toilets
- Cistern for Rainwater Storage
- Drought Tolerant Landscape Design
- High Efficiency Chilled Water for Building



Energy & Sustainability Solutions

Leadership in Energy and Environmental Design (LEED)

- Valencia Commitment on all New Buildings
- Three (3) LEED New Construction Projects Completed

VCC/UCF Joint Use Facility

- 100,000 Sq. Ft. Facility
- On-Site Renewable Energy (Solar)
- Green Power Purchase
- Air Ducts Sealed During Construction
- Water Efficient Faucets with Motion Sensors
- High Efficiency Chilled Water for Building



Guaranteed Energy Performance Contracting

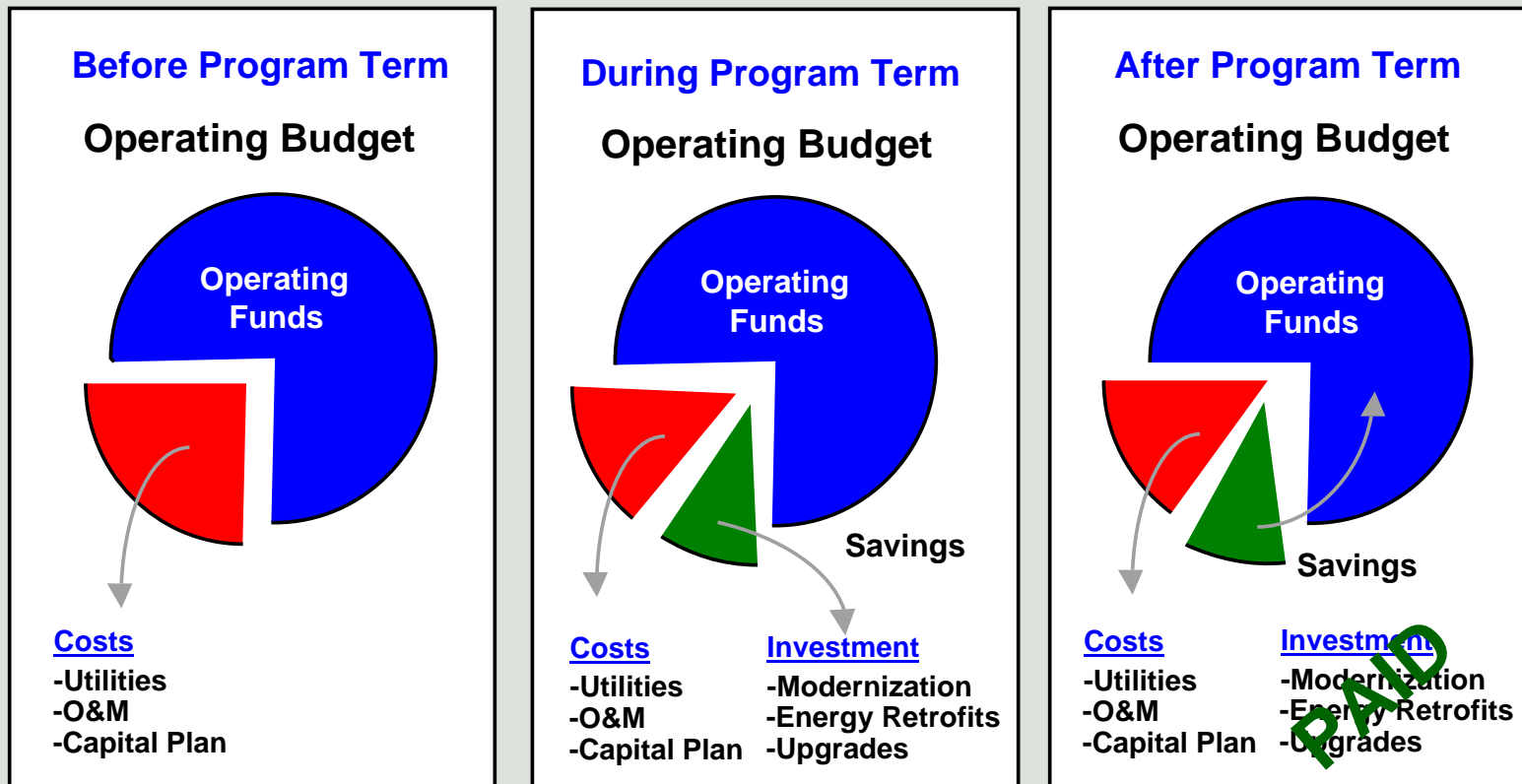


Guaranteed Energy Performance Contracting

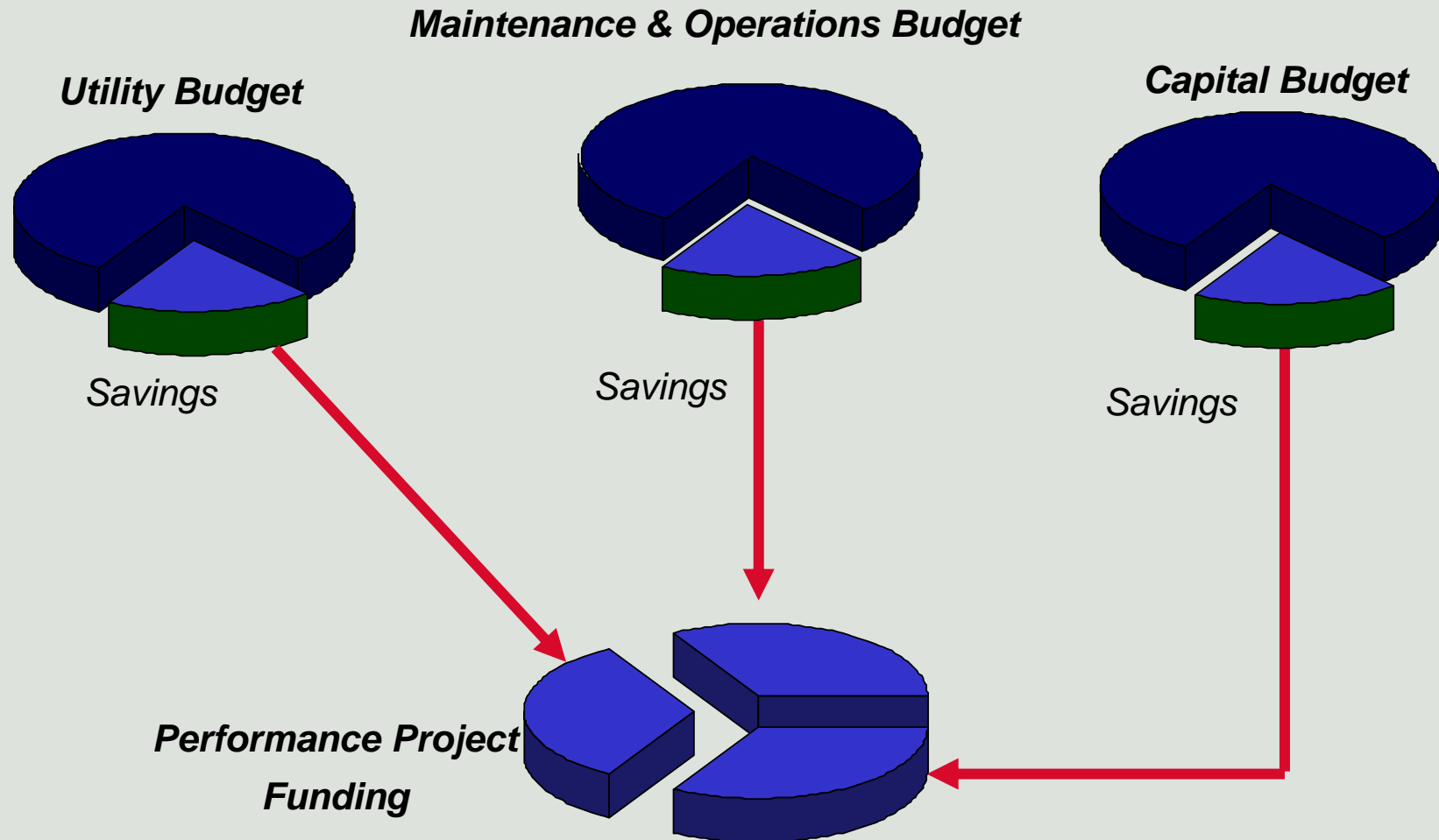
What is Energy Performance Contracting?

- The Process of Leveraging GUARANTEED Future Cash Savings From Energy and Operational Costs to Invest in Facility Improvements Right Now
- Redirection of Capital Currently Flowing to Utility Costs and Maintenance to Fund Facility Improvements Now

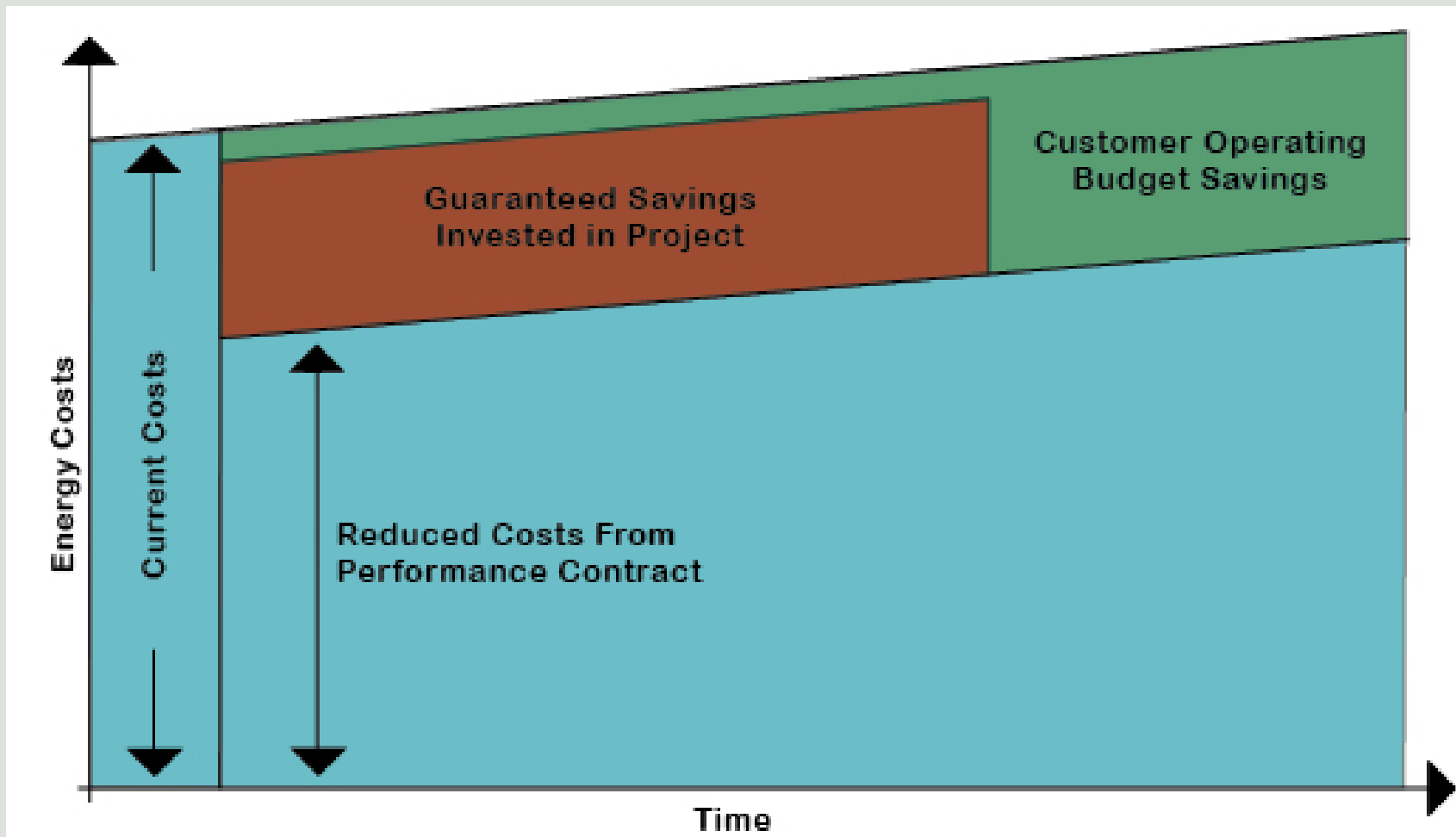
Guaranteed Energy Performance Contracting



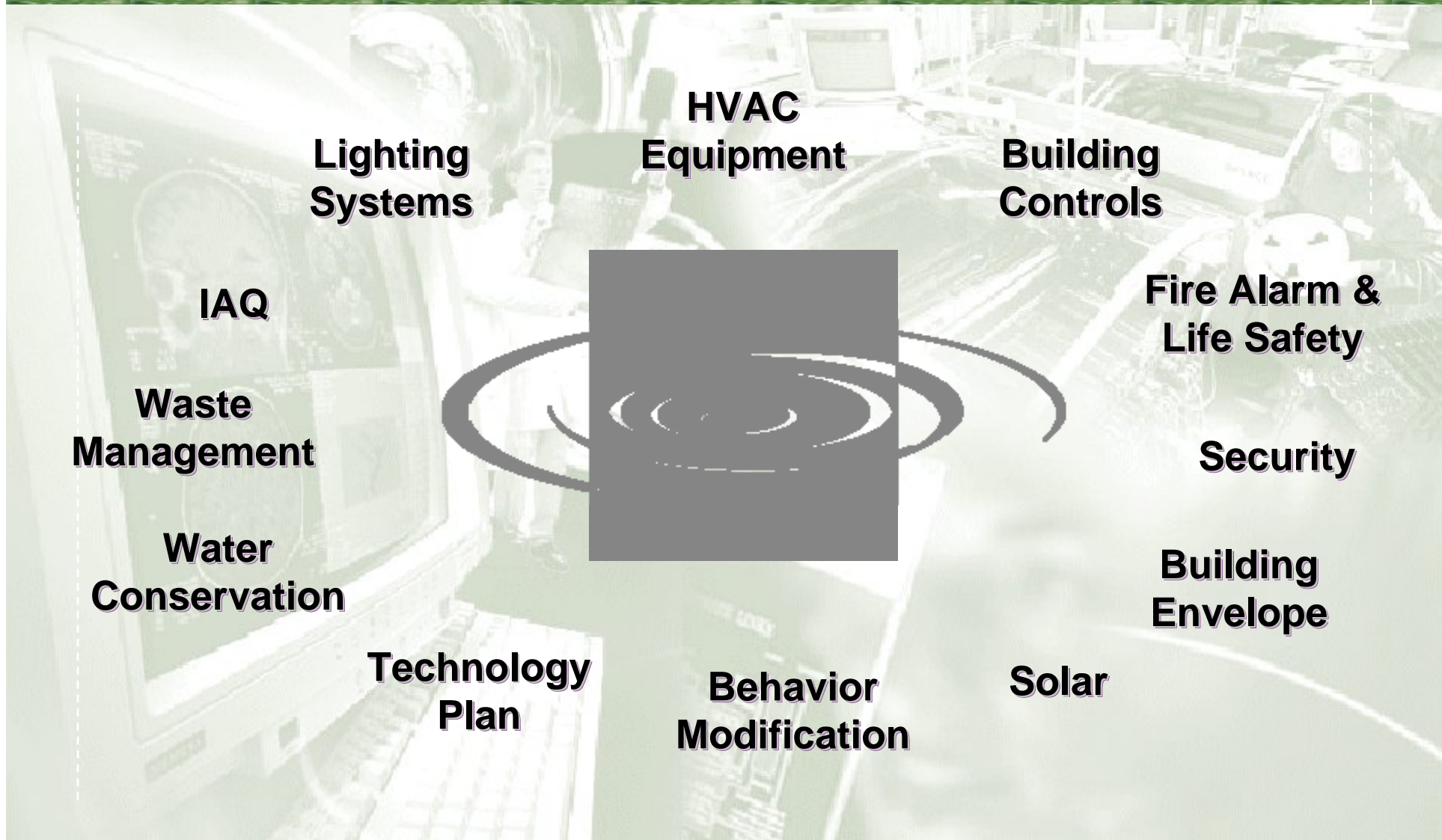
Guaranteed Energy Performance Contracting



Guaranteed Energy Performance Contracting



Guaranteed Energy Performance Contracting



Guaranteed Energy Performance Contracting

Example Performance Contract Financials

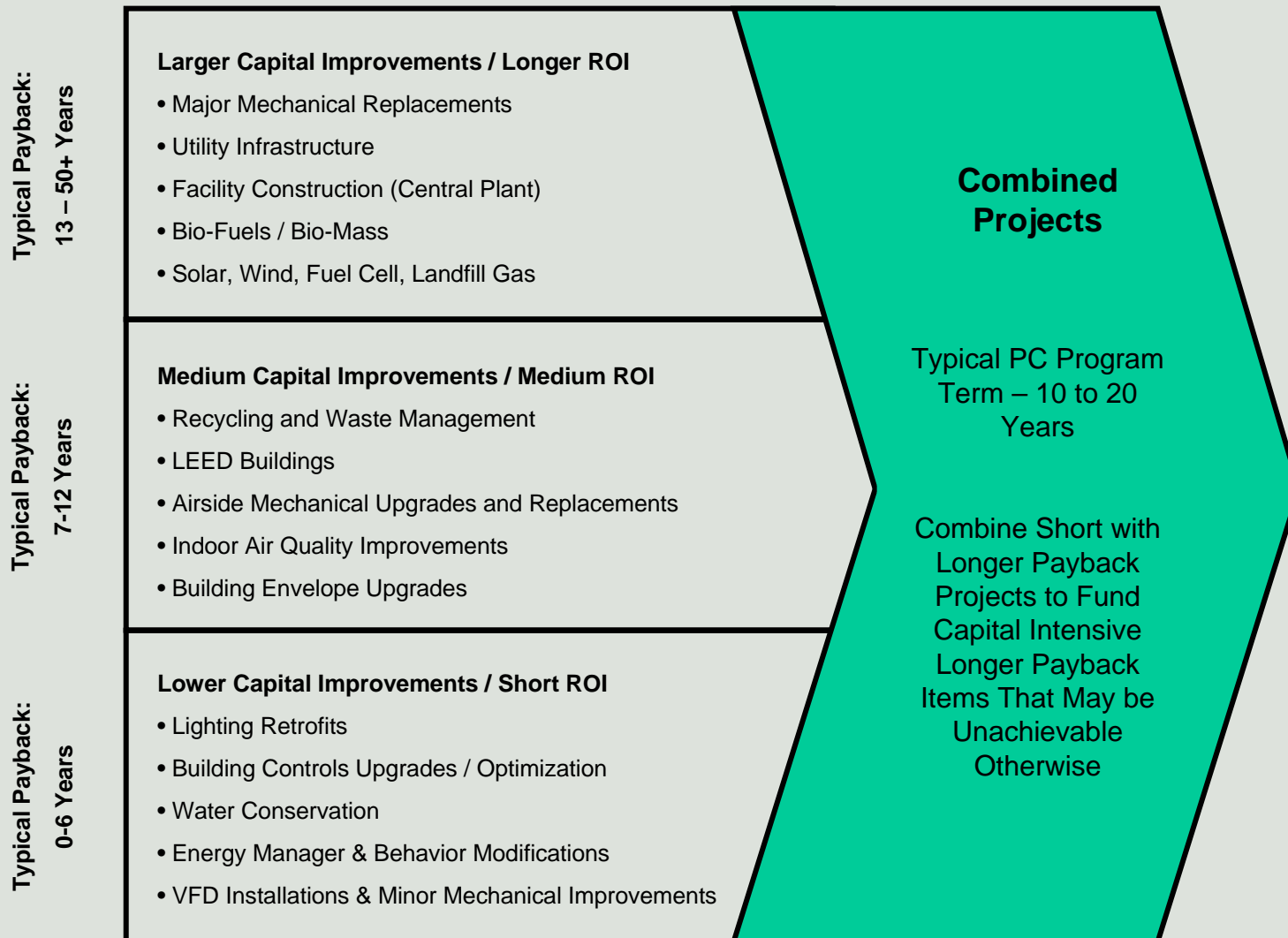
Project Cost	\$10,000,000
Project Term	20 Years
Savings Guarantee	\$ 1,000,000
Actual Savings	\$ 1,100,000
ESCO Guarantee Contribution	\$ 0
Annual Debt Service	\$ 730,000
Annual Mechanical & Controls Service	\$ 100,000
Annual Performance Assurance Svc.	<u>\$ 100,000</u>
Total	\$ 930,000
Net Annual Cash Flow	\$ 170,000
Total Term Cash Flow	\$ 3,400,000

Guaranteed Energy Performance Contracting

Example Performance Contract Financials

Project Cost	\$10,000,000
Project Term	20 Years
Savings Guarantee	\$ 1,000,000
Actual Savings	\$ 950,000
ESCO Guarantee Contribution	\$ 50,000
Annual Debt Service	\$ 730,000
Annual Mechanical & Controls Service	\$ 100,000
Annual Performance Assurance Svc.	\$ 100,000
Total	\$ 930,000
Net Annual Cash Flow	\$ 70,000
Total Term Cash Flow	\$ 1,400,000

Guaranteed Energy Performance Contracting



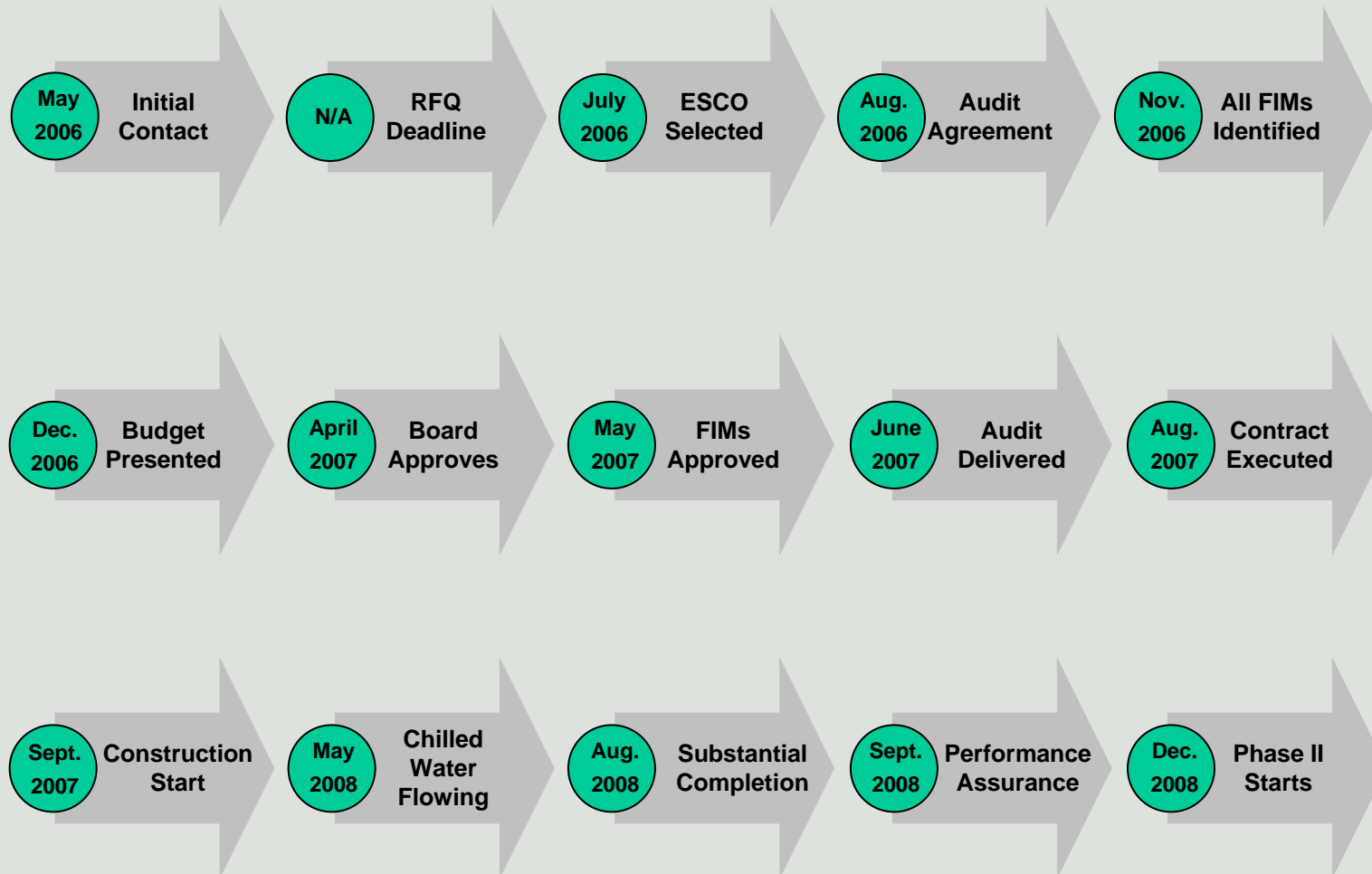
Guaranteed Energy Performance Contracting

Current Performance Contracting Trends

- **Developing New Savings Projects in Existing Buildings**
- **Deferred Maintenance Plan**
- **Unfunded Projects**
- **New Buildings**
- **Upgrading Older Equipment**
- **Campus Master Energy Planning**
- **Pursuing LEED Building Certification**

Guaranteed Energy Performance Contracting

Performance Contract Timeline



Guaranteed Energy Performance Contracting

Pre-Existing Central Energy Plant

- 1,230 Tons of Cooling Capacity (4 Chillers)
- Incremental Expansion Over Time
- Convoluted Pipe Layout
- Central Boiler System
- Underground Hot Water Leaks
- Antiquated Cooling Towers



Pre-existing Central Energy Plant

Guaranteed Energy Performance Contracting

Renovated Central Energy Plant

- 2,300 Tons of Cooling Capacity (5 Chillers)
- 4,800 Tons of Cooling Tower Capacity
- Highest Efficiency Design
- Complete Variable Flow System
- Eliminated Central Boiler System
- New Underground Chilled Water Pipe



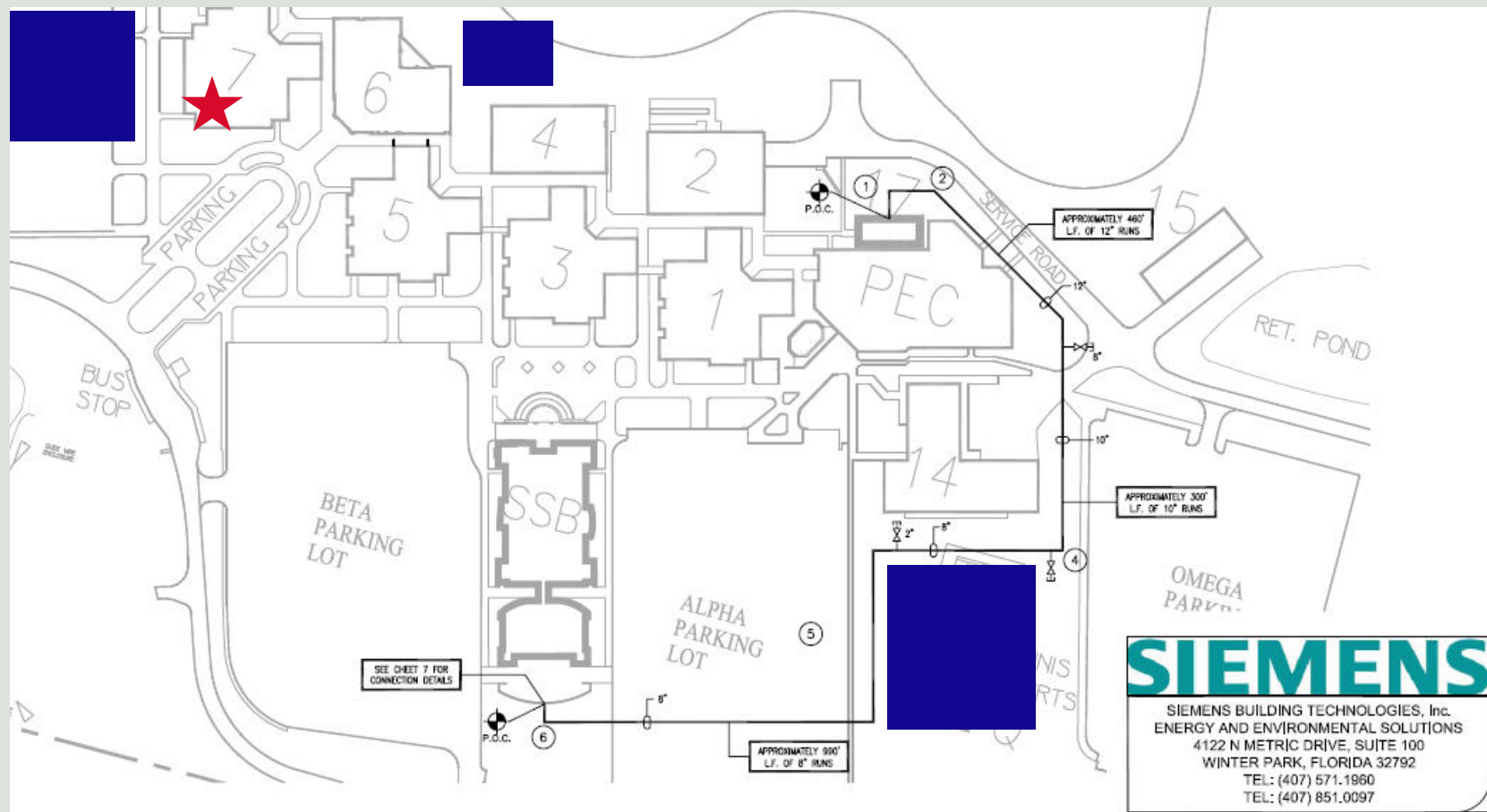
Renovated Central Energy Plant



Guaranteed Energy Performance Contracting

New Underground Chilled Water Lines

- Additional 2 Existing & 1 New Building, with Capacity for 2 Planned Buildings



Guaranteed Energy Performance Contracting

New Heat & Re-heat Solution

- Eliminated Central Boiler System
- Abandoned Failing Underground Hot Water Pipes
- Installed High Efficiency Point of Use Boilers (3 Buildings)
- Converted From Hot Water to Electric Heat (1 Building)



Pre-existing Central Boiler System



Point of Use High Efficiency Boiler

Guaranteed Energy Performance Contracting

Airside System Upgrades

- Total Building VAV Retrofit
- Air Handler Replacements
- Variable Frequency Drive Installations
- Building Controls Upgrades and Optimization
- Drop Ceiling Replacement



VAV, Controls & Ceiling Upgrade

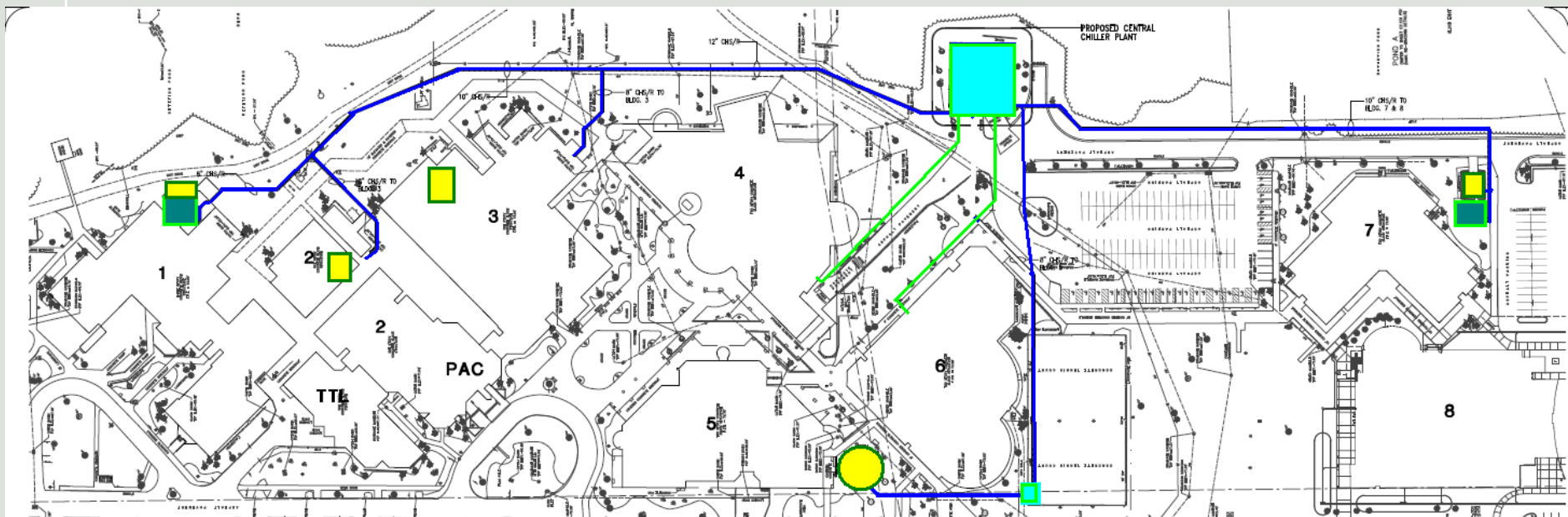


New Air Handler

Guaranteed Energy Performance Contracting

New Campus Chilled Water Plant

- Replacement of Distributed Air Cooled with High Efficiency Water Cooled Plant
- New Underground Pipe
- Campus-wide Controls Upgrade
- Individual Building Metering



Guaranteed Energy Performance Contracting



Guaranteed Energy Performance Contracting

Thermal Energy Storage Solution

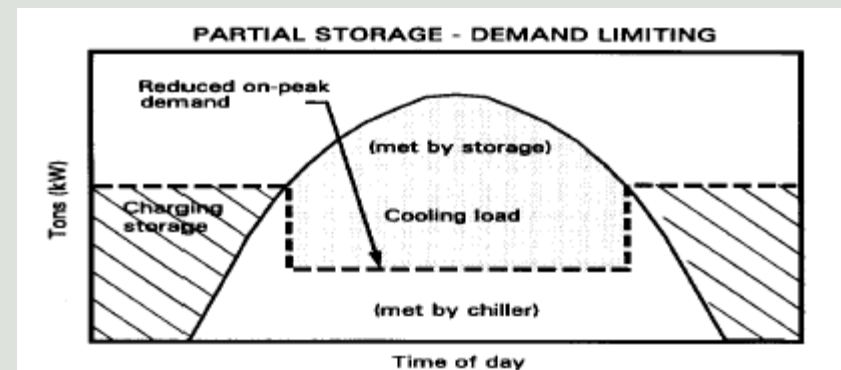
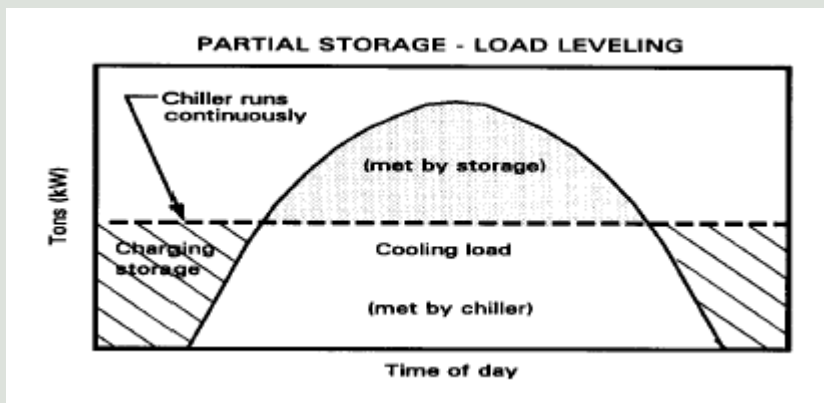
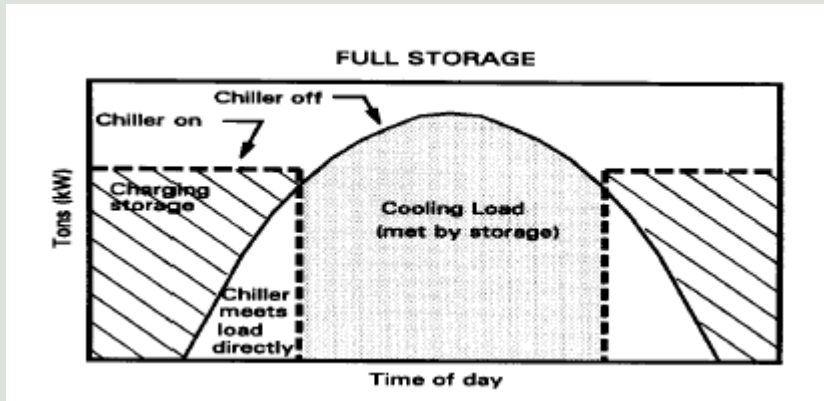


Figure 1. Operating Strategies for TES

Guaranteed Energy Performance Contracting

Energy Information Kiosk

- Student and Staff Education and Information

VALENCIA

71°F

Overcast

9:12 AM

Home

Education

Green

Energy Monitoring

Fun Facts

- 99% of the natural gas used in the United States comes from North America.

Energy Performance Contract

In 2006, Valencia and Siemens entered into an agreement to complete an in depth energy study with the intent of developing a project that would produce a significant amount of energy and dollar savings for the college.

As a result of the study and the an going partnership, Siemens is currently implementing many of the projects that were developed.

Energy Savings & Environmental Impact

With increasing energy costs, and dwindling resources, it is more important than ever to increase efficiency. As a result of the West Campus Energy Performance Contract, we will achieve the following annually:

3,104,142 kWh Energy Savings

The highlight of this partnership with Siemens is that the energy reductions are guaranteed for the next 20 years!

The annual savings are equivalent to:

2,440 Acres
of Forest Preserved

637 Cars
Removed from
the Road

6,808 Oil
Barrels not Burned

Learn More

Guaranteed Energy Performance Contracting

Energy Information Kiosk

- Student and Staff Education and Information

VALENCIA

71°F

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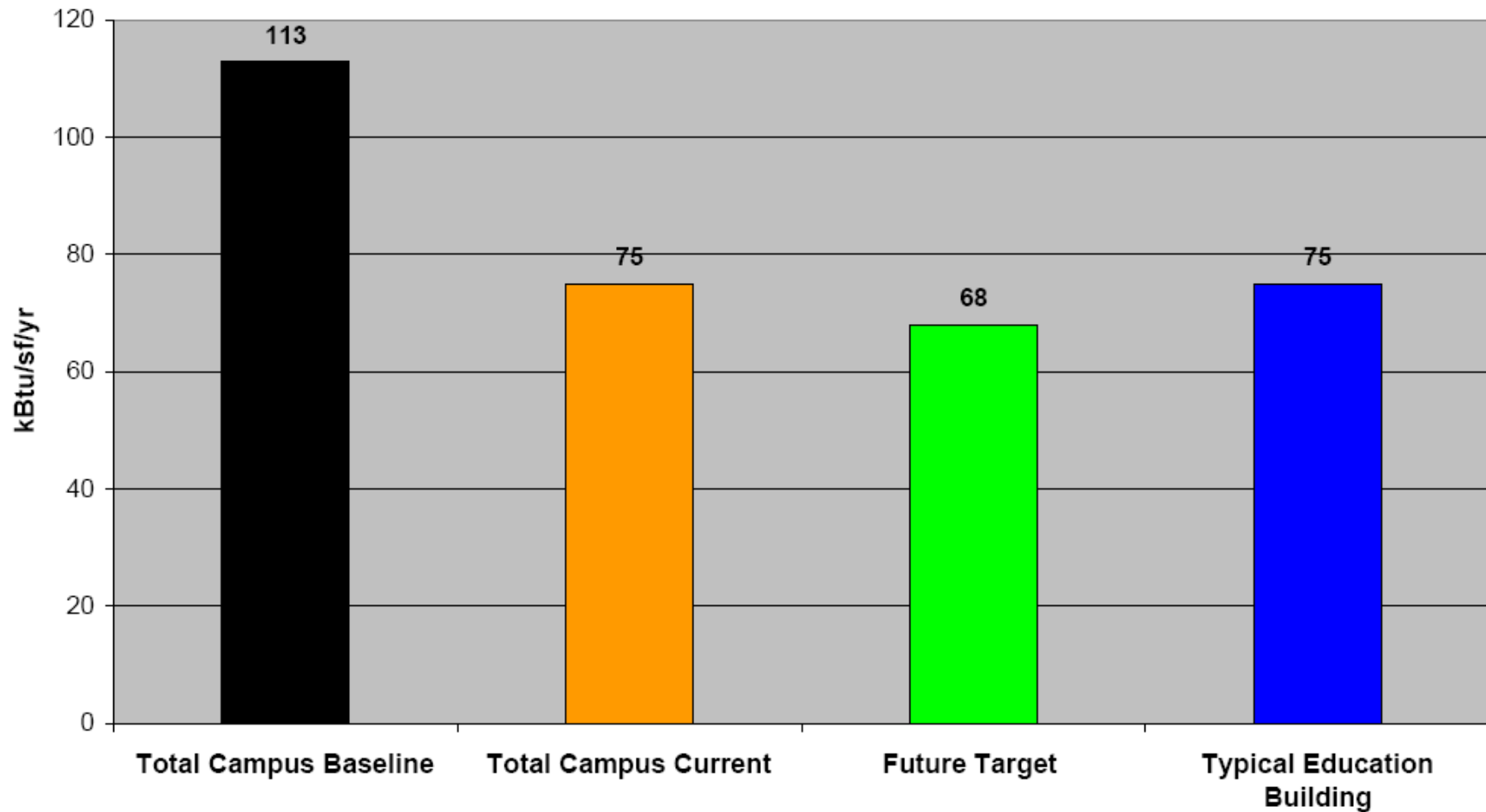
Learn More

Measuring the Results



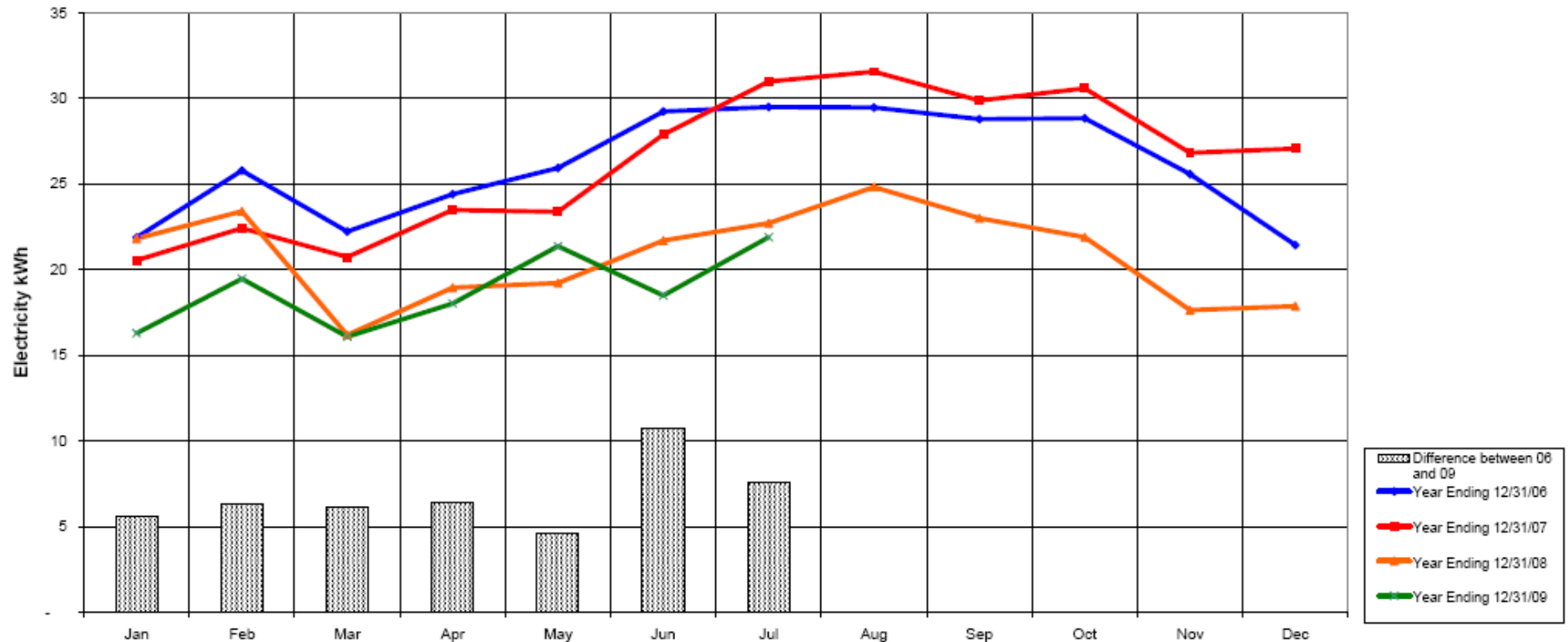
Measuring the Results

**Total West Campus kBtu/sf/yr
Year One**



Measuring the Results

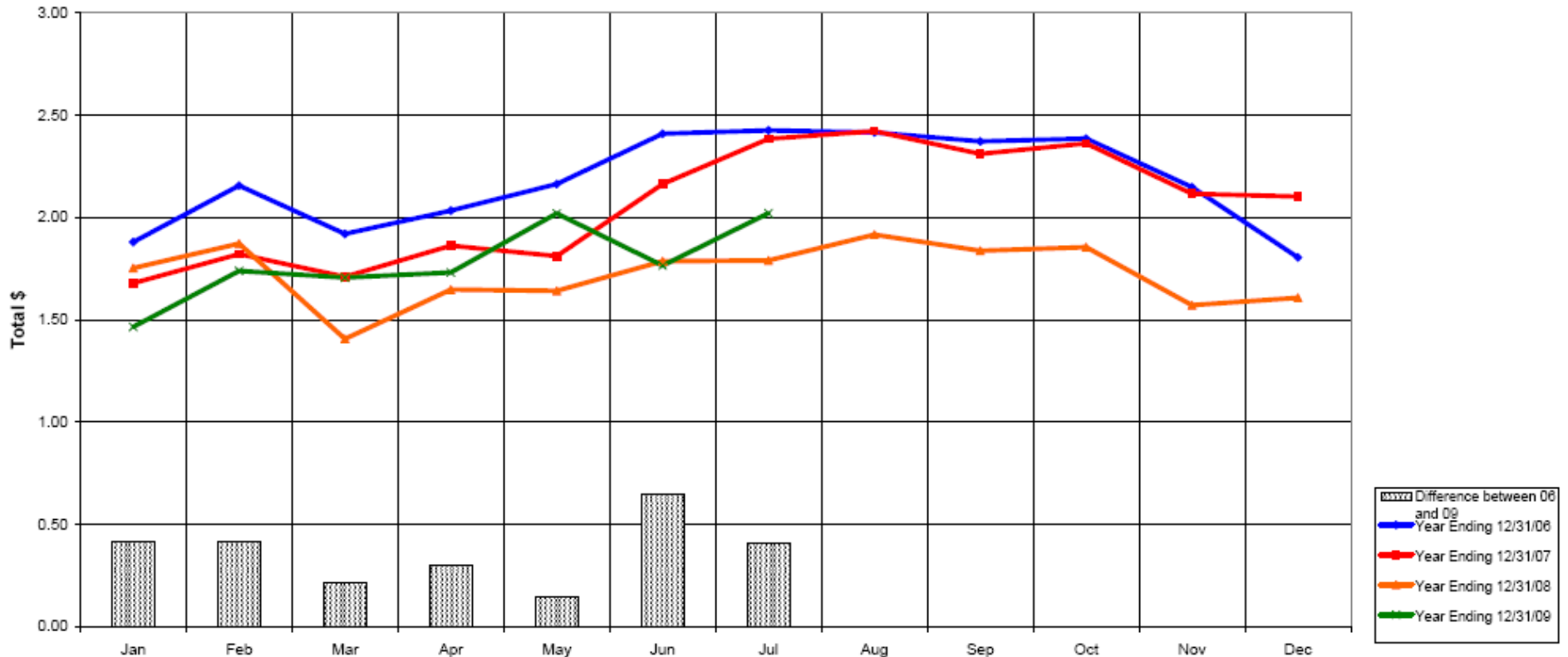
kWh Per Sq Ft - VCC West Campus



Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Vs. Prev.	Vs. 2006
Year Ending 12/31/06	21.89	25.79	22.23	24.41	25.94	29.24	29.50	29.47	28.79	28.85	25.59	21.44	26		
Year Ending 12/31/07	20.55	22.43	20.74	23.49	23.38	27.90	30.99	31.57	29.88	30.59	26.82	27.07	26	1%	1%
Year Ending 12/31/08	21.82	23.41	16.19	18.95	19.22	21.71	22.71	24.82	23.01	21.90	17.64	17.88	21	-21%	-20%
Year Ending 12/31/09	16.29	19.47	16.09	18.03	21.37	18.49	21.90						19	-9%	-28%

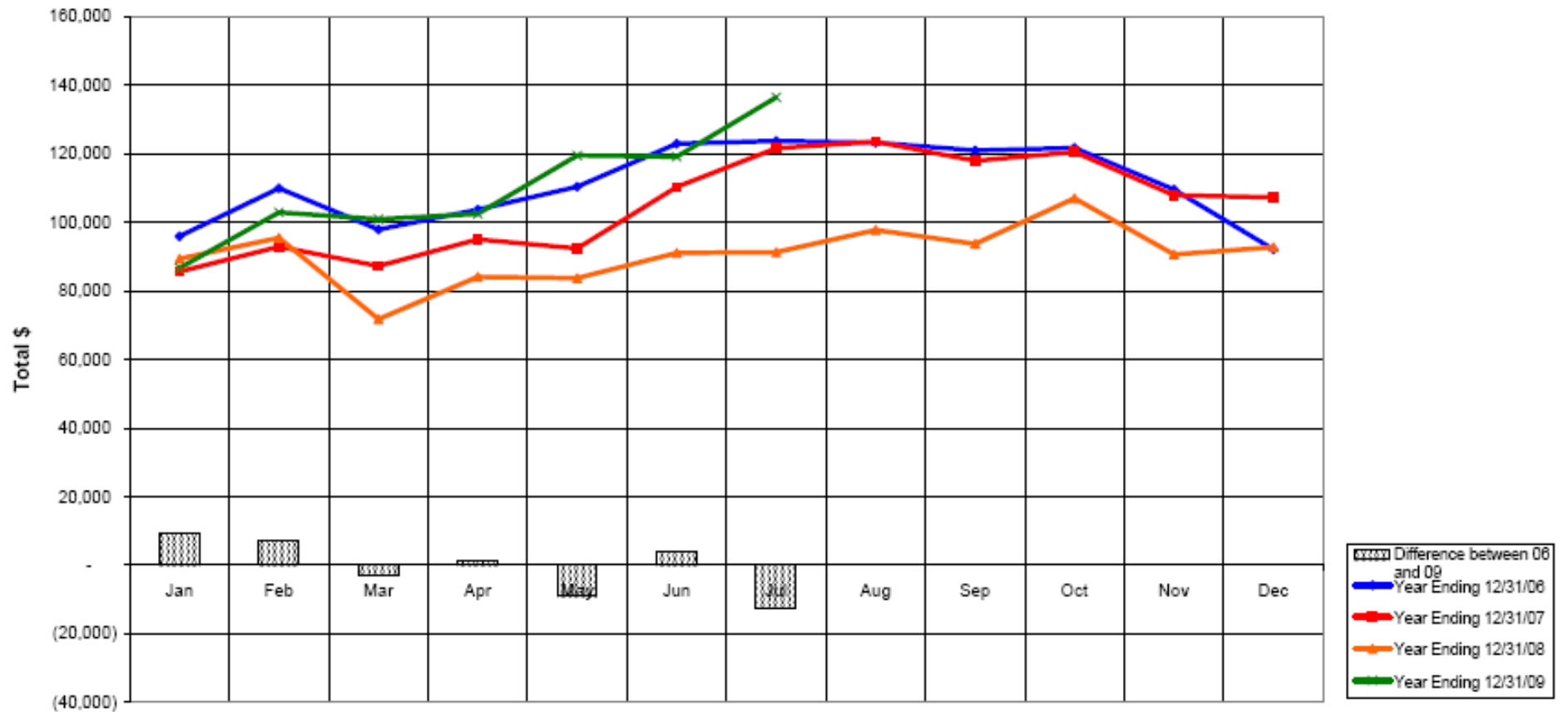
Measuring the Results

\$ Per Sq Ft - VCC West Campus



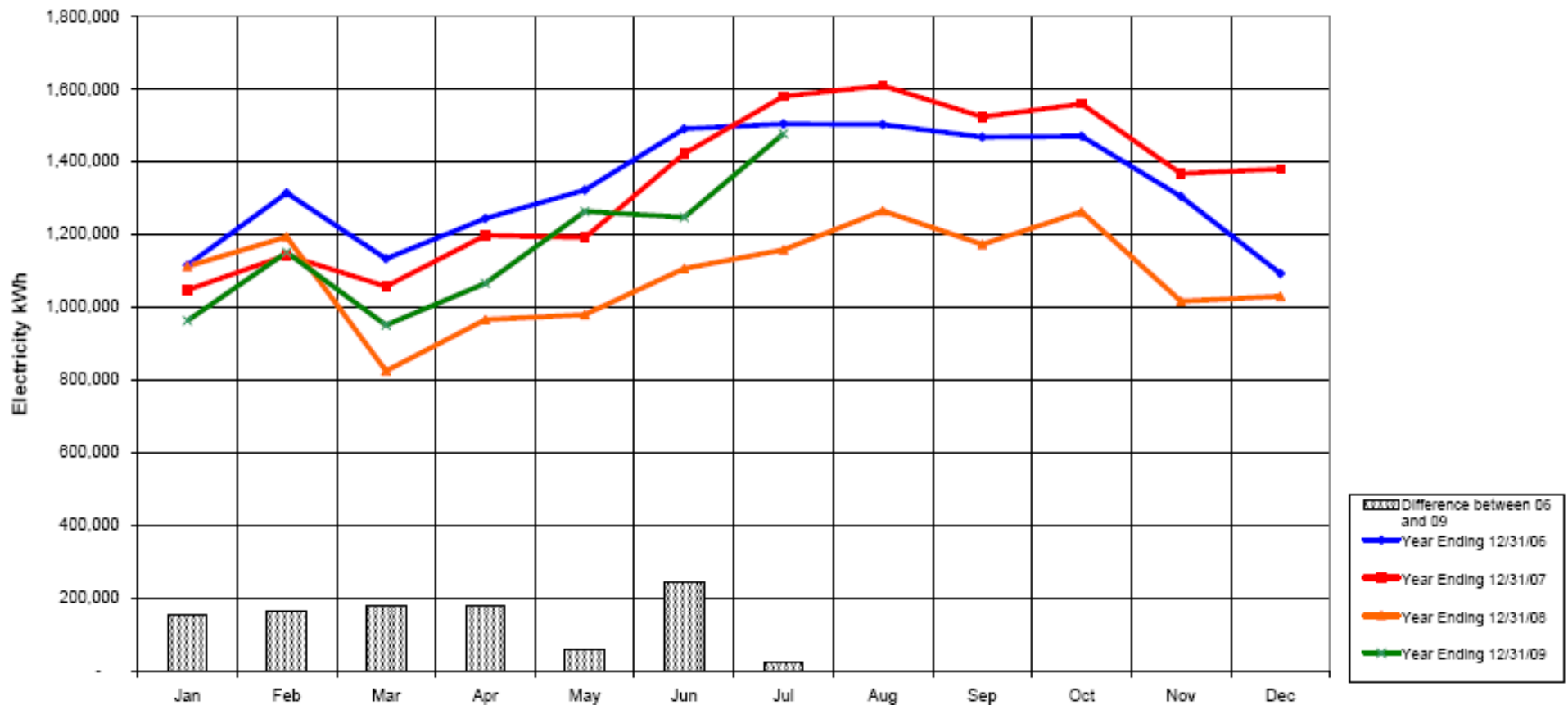
Measuring the Results

Actual Total \$ for Electric Area



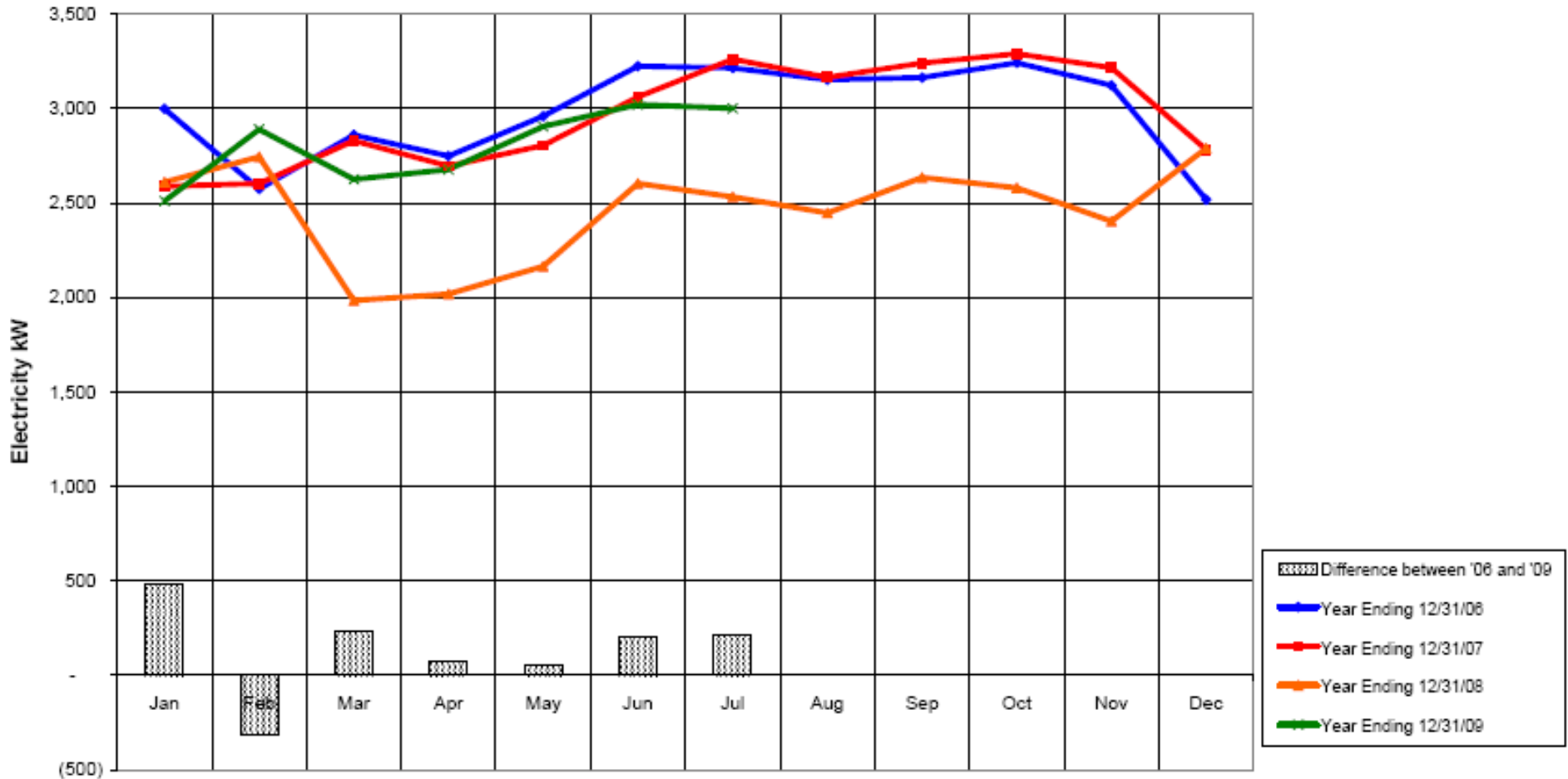
Measuring the Results

Actual Electricity kWh for Electric Area



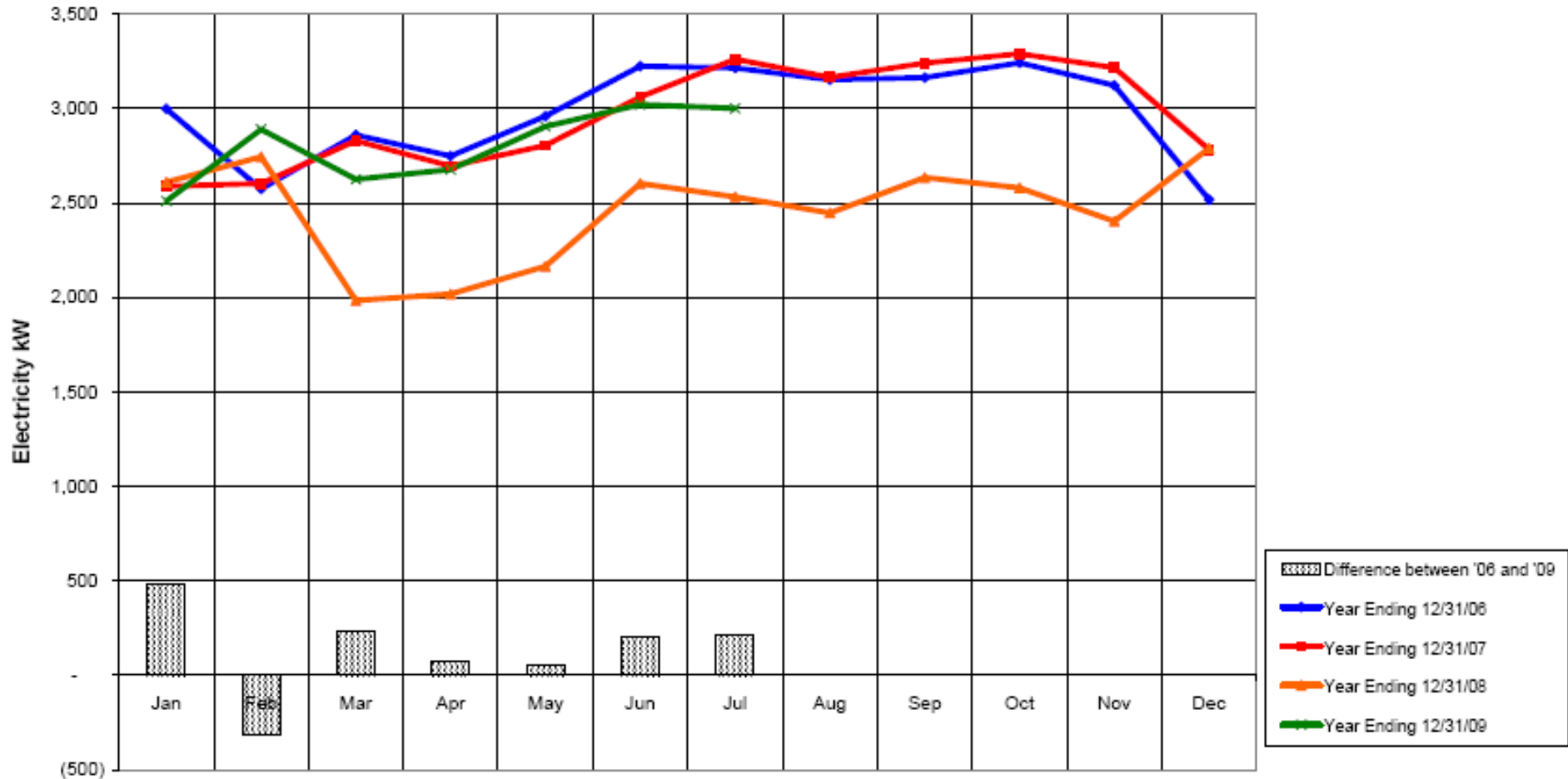
Measuring the Results

Actual Electricity kW for Electric Area



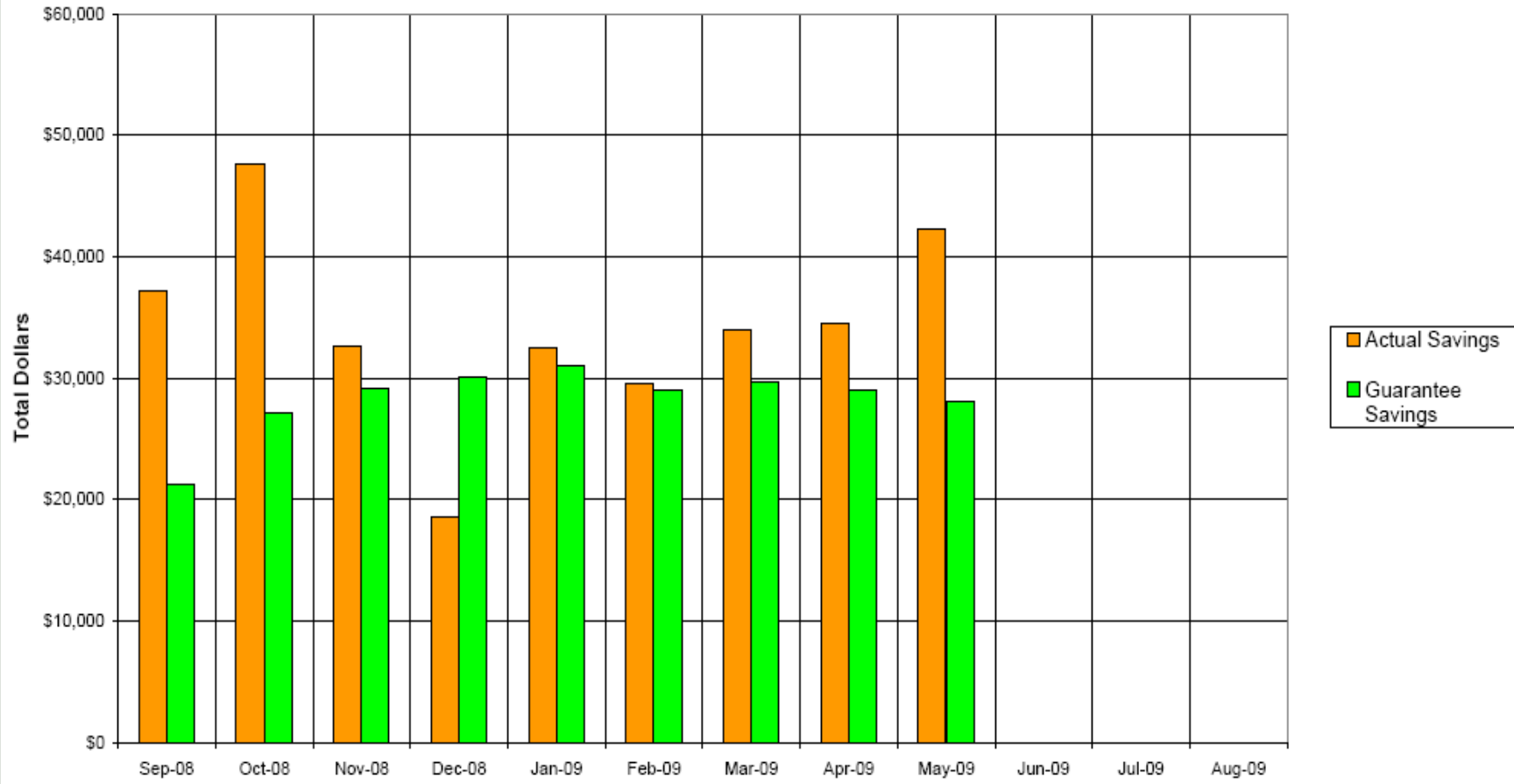
Measuring the Results

Actual Electricity kW for Electric Area



Measuring the Results

West Campus Dollar Savings



Guarantee Savings	\$21,317	\$27,187	\$29,145	\$30,136	\$31,089	\$28,967	\$29,755	\$29,015	\$28,025				\$254,635
Actual Savings	\$37,207	\$47,643	\$32,611	\$18,584	\$32,556	\$29,540	\$33,992	\$34,561	\$42,311				\$309,006
Excess Savings	\$15,891	\$20,456	\$3,466	-\$11,552	\$1,467	\$573	\$4,237	\$5,547	\$14,286				\$54,370

Measuring the Results

Building FIM	Electric Power Saved (kW)	Electric Energy Saved (kWh)	Natural Gas Saved (Therms)	Water Consumption Saved (kGallons)	Totals
CEP	\$10,561	\$83,064	\$0	\$0	\$93,625
SSB	\$3,585	\$35,294	\$0	(\$4,736)	\$34,143
1	(\$824)	\$7,151	\$21,983	\$1,953	\$30,263
2-3-5	\$337	\$17,414	\$26,247	\$697	\$44,695
4	\$0	(\$3,151)	\$11,008	\$986	\$8,843
6	\$724	\$17,720	\$24,692	\$4,893	\$48,029
7	\$5,805	\$12,975	\$0	(\$6,931)	\$11,849
8	\$3,986	\$6,920	\$0	(\$1,573)	\$9,333
10	\$14,023	\$35,153	\$0	(\$5,390)	\$43,786
Totals	\$38,198	\$212,541	\$83,929	(\$10,102)	\$324,566

Phase I Project – Valencia West Campus

- Year 1 Energy Guarantee - \$324,566
- Savings (3 Quarters) - \$303,539
- Year 1 Expected Savings - \$400,000
- Projected Excess Y1 Savings - \$75,434

For Year 1- First Quarter (9/01/08-11/30/08), the following describes the breakdown of the savings:

Savings Description	Actual Savings	Guarantee*	Excess/Shortfall
Electric Savings	\$ 85,117	\$ 57,242	\$ 27,875
Gas Savings	\$ 27,133	\$ 16,655	\$ 10,479
Modeled Savings	\$ 3,752	\$ 3,752	\$ 0
Total Savings Cost Avoidance	\$ 116,003	\$ 77,649	\$ 38,354

For Year 1- Second Quarter (12/01/08-2/28/09), the following describes the breakdown of the savings:

Savings Description	Actual Savings	Guarantee*	Excess/Shortfall
Electric Savings	\$ 50,734	\$ 32,513	\$ 18,221
Gas Savings	\$ 7,656	\$ 39,397	- \$ 31,741
Modeled Savings	\$ 18,282	\$ 18,282	\$ 0
Total Savings Cost Avoidance	\$ 76,672	\$ 90,192	- \$ 13,520

For Year 1- Third Quarter (3/1/2009 – 5/31/2009), the following describes the breakdown of the savings:

Savings Description	Actual Savings	Guarantee*	Excess/Shortfall
Electric Savings	\$ 77,043	\$ 53,657	\$ 23,386
Gas Savings	\$ 16,580	\$ 15,897	\$ 684
Modeled Savings	\$ 17,241	\$ 17,241	\$ 0
Total Savings Cost Avoidance	\$ 110,864	\$ 86,795	\$ 24,070

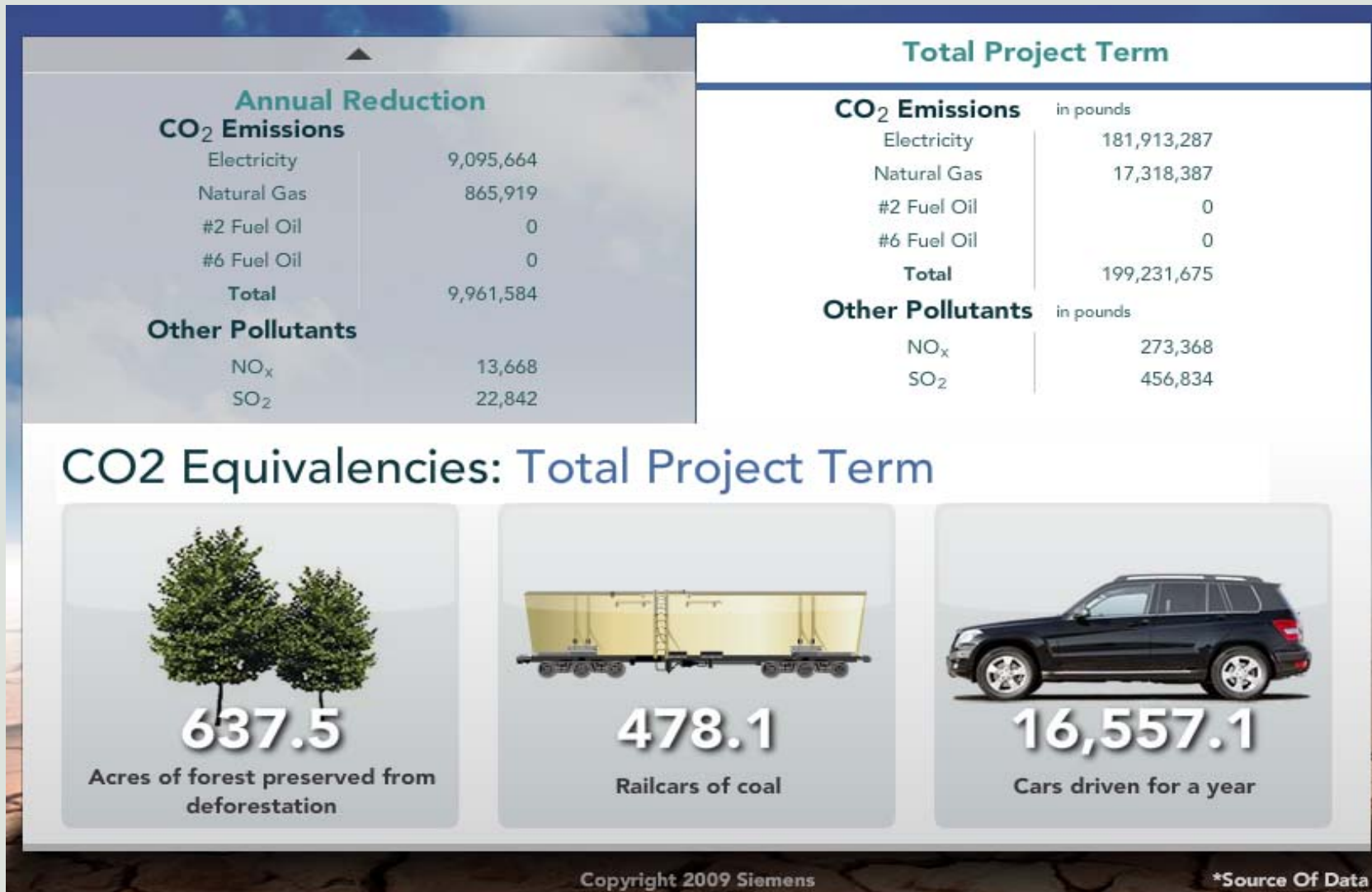
Measuring the Results

Performance Contract Financial Facts

- **\$13.5M in Capital Construction**
- **\$900K per Year in Guaranteed Energy Savings***
- **20 Year Guarantee**
- **\$18M in Total Guaranteed Savings***
- **Currently Exceeding Guaranteed Savings Plan by 20%**
- **Current Goal of \$1M in Annual Savings**

* Average Dollar Equivalency Based on Cost of kW, Kwh, Therms & kGal Water Saved

Measuring the Results



Summary



Summary

- **Identify Challenges**
- **Quantify & Measure: Establish Baseline**
- **Build Internal Support**
- **Develop a Plan**
- **Engage Industry Partners to Help with the Heavy Lifting**
- **Quantify & Measure**
- **Report Results**

Q & A / Discussion



For More Information Contact:

Marc Craddock, CEM

Siemens Industry, Inc.

Building Technologies

407-571-1927

marc.craddock@siemens.com