



Center For Energy Management



Implementing EISA 2007



Strategies For Success at GSA

Mark Ewing





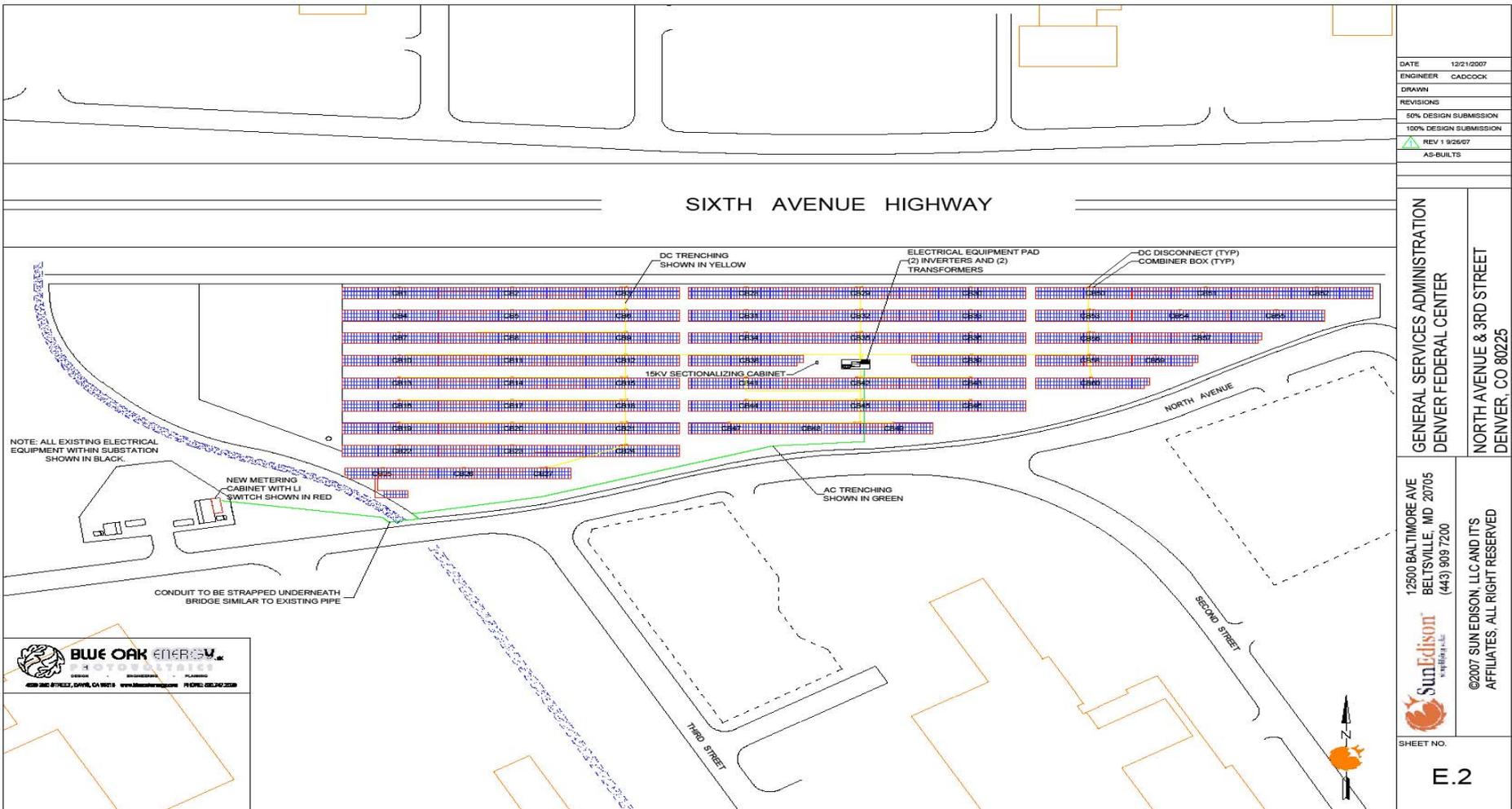
GSA Strategies

- Onsite Generation
 - PV & Solar Energy Credits
 - Cogen & Source Use credits
 - Demand side management
- Expanding Advanced Metering
- Renewable Power Procurement
- Enhancing Energy Tracking
- PC Power Control Management





Denver Federal Center PV Plant



DATE	12/21/2007
ENGINEER	CADCOCK
DRAWN	
REVISIONS	
50% DESIGN SUBMISSION	
100% DESIGN SUBMISSION	
REV 1 9/25/07	
AS-BUILTS	

GENERAL SERVICES ADMINISTRATION
DENVER FEDERAL CENTER
NORTH AVENUE & 3RD STREET
DENVER, CO 80225

12500 BALTIMORE AVE
BELTSVILLE, MD 20705
(443) 909 7200



SHEET NO.

BLUE OAK ENERGY
40 YEARS
CONTRACTORS ENGINEERS PLANNERS
4030 28th STREET, DAVIS, CA 95618 www.blueoakenergy.com PHONE: 916.742.2258



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01/09/2007



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U.S. General Services Administration
National Archive and Records Administration





SOLAR POWER

- What is solar power
- How a solar roof works
- Energy Production

BENEFITS

- Overview
- Global system savings
- Global warming

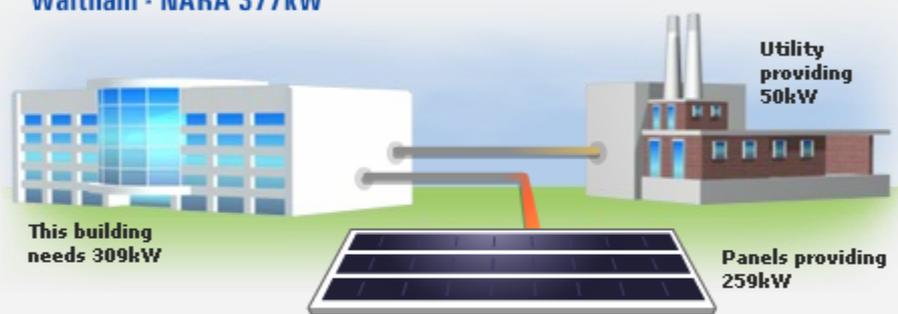
SELECT ADDITIONAL SITES

Waltham



SUMMARY DATA VIEW SYSTEM FACTS

Waltham - NARA 377kW



WIND SPEED 0 mph

Wind has a cooling effect on solar electric panels making them more efficient and thus improve performance.

	MAX	MIN	AVG
TODAY	0	0	0
THIS MONTH	12	0	1



POWER
This site has produced 804kW of power today

EMISSIONS
This site has reduced 745lbs of CO2 emissions today



Waltham, MA BIPV Roof

New England Region project

- 300 KW building integrated Photovoltaic system
- Inter connected to NSTAR grid
- At peak can produce approximately 50% of buildings electricity need.
- Often returns power to grid
- Region 1
- Twice the cost of traditional roof.





Case Study: FRC White Oak (FDA)





More than just Generation . . .

. . . It's CO-Generation!

- Generation of electricity combined with heat recovery to optimize energy use
- Helps to minimize risks of fluctuating electricity prices



Leading the Way



GSA and FDA worked to assemble a third-party financed project to install a cogeneration system for the new campus, requiring no additional capital funding



Distributed Generation

- Distributed generation can provide secure and highly available power with the potential for economic advantages.
 - Small generators can peak-shave when advantageous from market perspective.





Early Uses/Plans for Data –Demand Response Participation

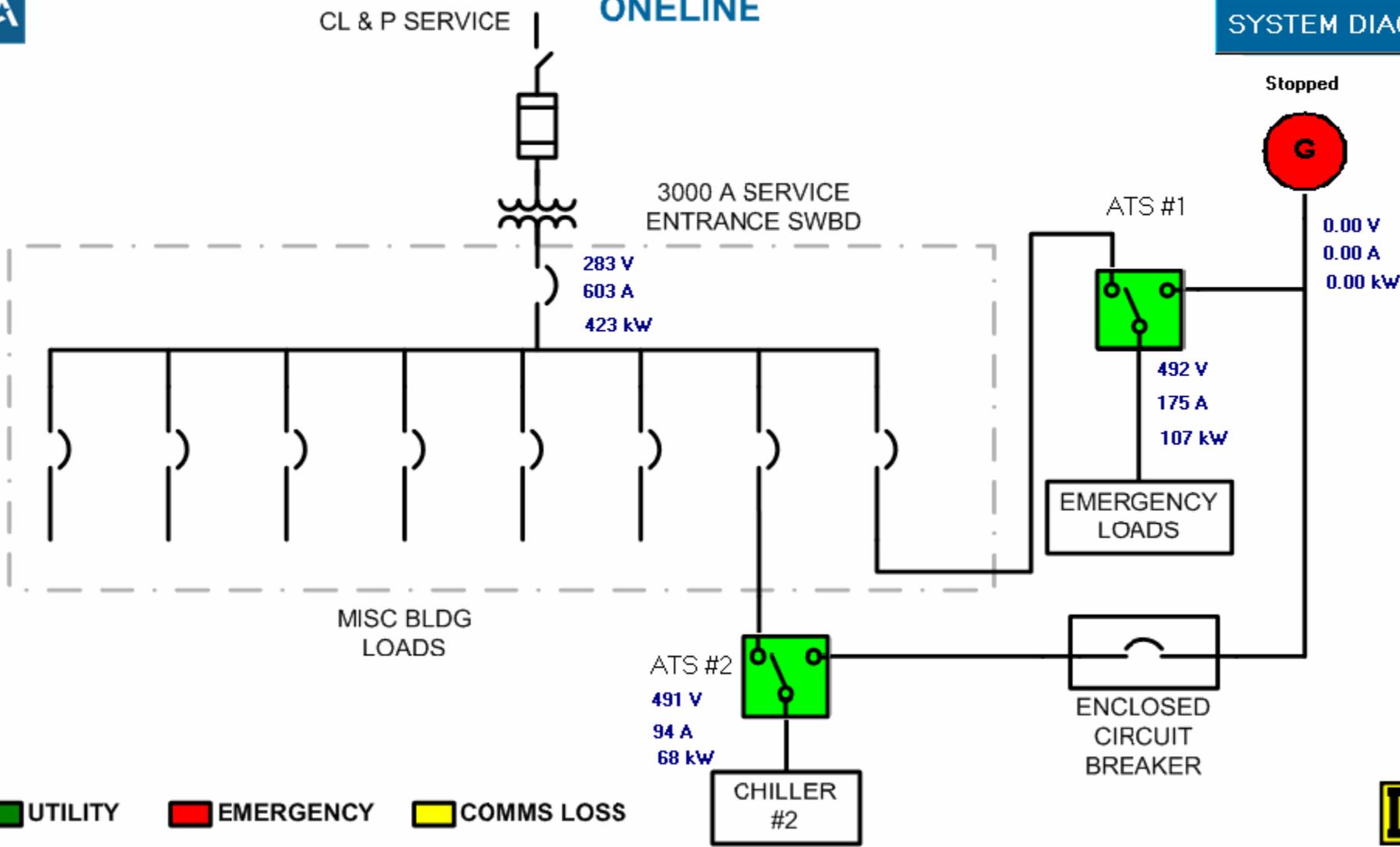
- GSA uses PLC Predictor service – South River Consulting
 - Email sent to bldg mgrs in PJM territory with notice of Gold day – curtailment actions taken
 - Follow progress of efforts live
- New England
 - Price Response program – voluntary curtailment
 - Demand Response program – penalized if you don't curtail amount agreed upon
- Similar participation in other regions.





GIAIMO FEDERAL BUILDING ONLINE

MAIN MENU
SYSTEM DIAG





GIAIMO FEDERAL BUILDING USER INPUT

- MAIN MENU
- ONLINE
- SYSTEM DIAGNOSTICS

SYSTEM MODE:

AUTO

MODE SELECT

CHILLER #2 ON WHILE UTILITY
OUTAGE:

DISABLE

CHILLER #2 SELECT

MANUAL TRANSFER TO
EMERGENCY POWER

DISABLE

TRANSFER ATS-1

DISABLE

TRANSFER ATS-2

SYSTEM FAILURE ALARM
(MUST BE IN MANUAL MODE TO RESET)

ALARM RESET

LOAD SHED EVENT ACTIVE
(MUST BE IN MANUAL MODE TO RESET)

EVENT RESET

GENERATOR PARAMETERS

MAXIMUM LOAD FACTOR%:

80 %

GENERATOR OVERLOADED



GSA Centralized Advanced Metering Data Effort

- System provides individual users quick access to customized screens, delivering up-to-the-minute data consistent with their needs.
- System will utilize the existing wide area network (WAN) infrastructure to transmit data from field devices to the server(s).
- Data storage and warehousing will be handled by the National Capital Region's IT staff under an agreement with GSA's Energy Center of Expertise.





Communications Requirements

- Data is typically time stamped in 15 minute intervals. The “front end” is provided by ION Enterprise. This system allows the presentation of real-time and historic data.
- A software module loads data from the ION Enterprise database into the ION EEM database for analysis in ION EEM.
- In order to get data into the system, meters will need to satisfy specific communications protocol and media.





Funding Strategy

- Field devices will be funded on a prioritized schedule; using funds approved for metering in GSA's annual budget based on the 2005 Advanced Metering Strategic Assessment Plan Initiative.
- GSA has received \$6 million in FY07 as a result of this request and will continue to request additional funds each budget cycle until the plan is adequately funded.
- Priority funding for regional hardware purchases and connection to the agency wide software program will occur based four factors:
 - (1) total annual cost of electricity (most recent 12-month period);
 - (2) annual electricity use per GSF;
 - (3) annual electricity consumption;
 - (4) demand response program is available either from the grid operator or local utility.



- ROB
- Monday Ops
- Tuesday Ops
- Wednesday Comp
- Thursday kWh
- Friday kWh
- Saturday Monitoring
- Sunday Dashboard

Regional Office Building

GSA NCR Regional Office Building

Web page

GSA NCR Regional Office Building



Aggregated Demand

kW : 1385.5

Average Power Factor

PF : -88.8



GSA_ROB.14737

kW tot : 675.5
I avg : 32.6
PF sign tot : -87.2



GSA_ROB.14738

kW tot : 342
I avg : 15.6
PF sign tot : -92.3

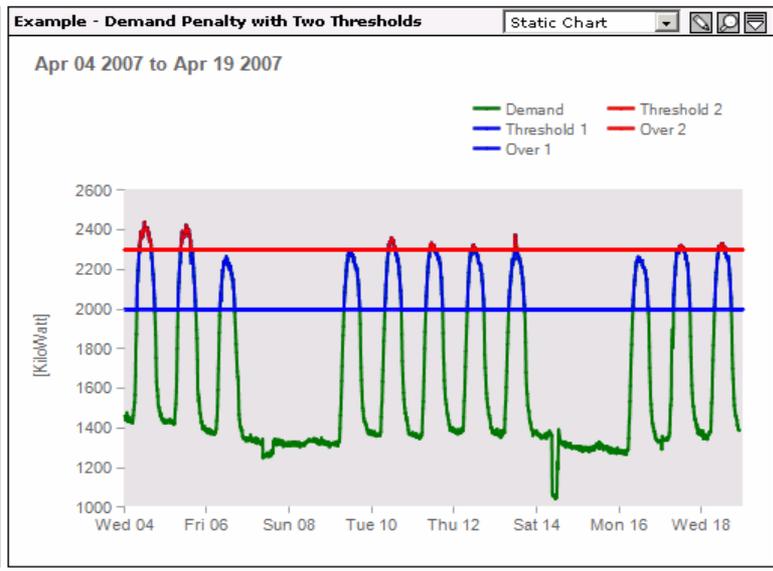
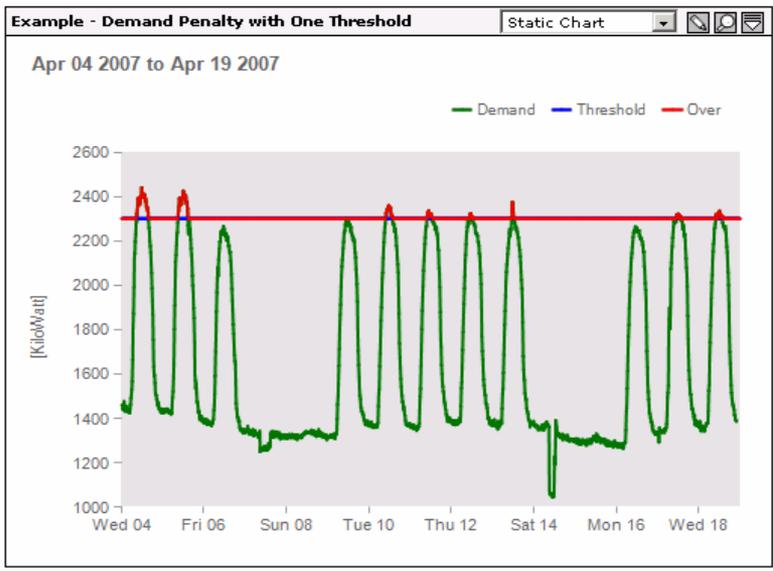
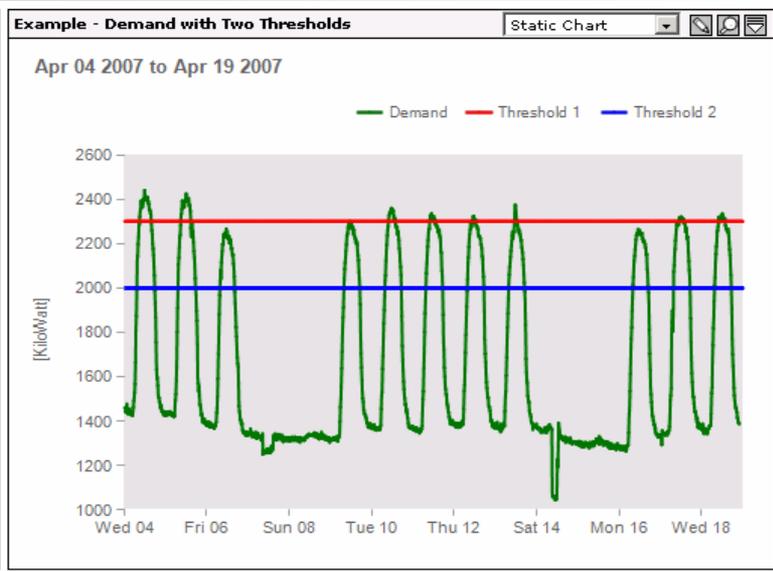
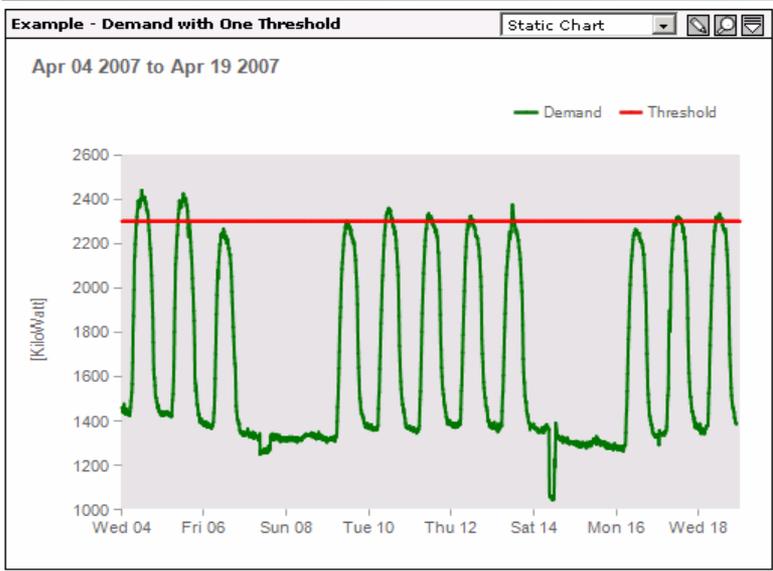


GSA_ROB.14739

kW tot : 365.7
I avg : 17.7
PF sign tot : -87.2

- Pages
- GSA - ROB
 - Weekday Ops
 - Weekend Ops
 - Weekend Comp
 - Off Hours kWh
 - General kWh
 - Dmd Monitoring
 - My Dashboard

Demand Monitoring at ROB

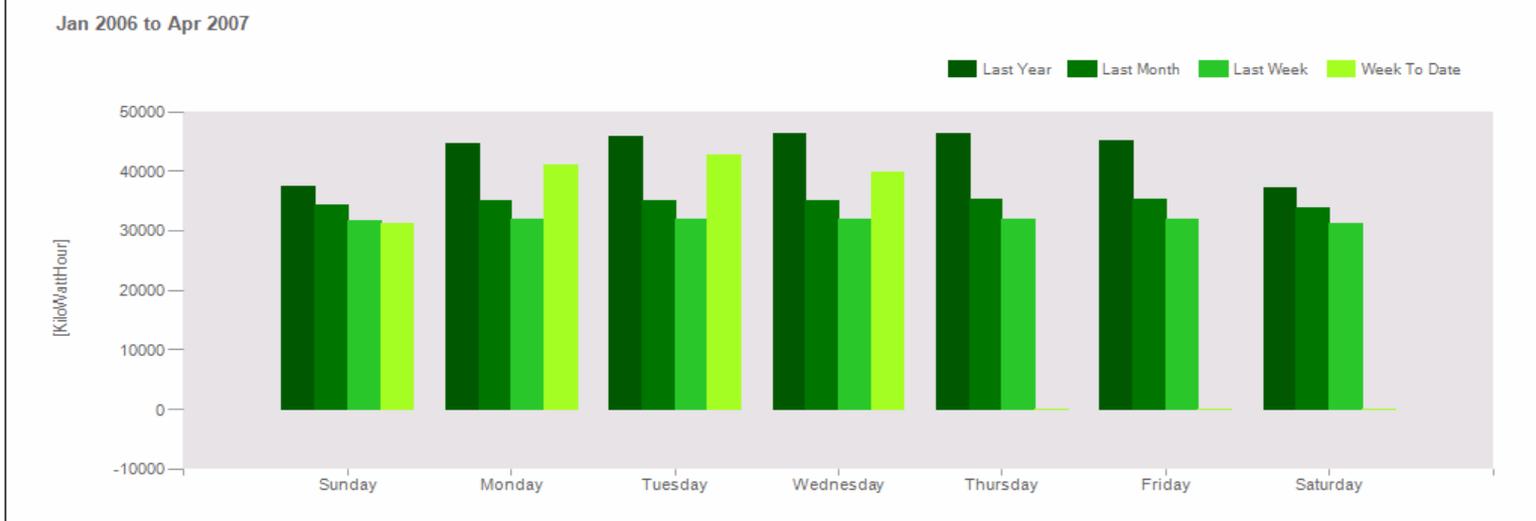


- Pages
- GSA - ROB
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General Usage Trends

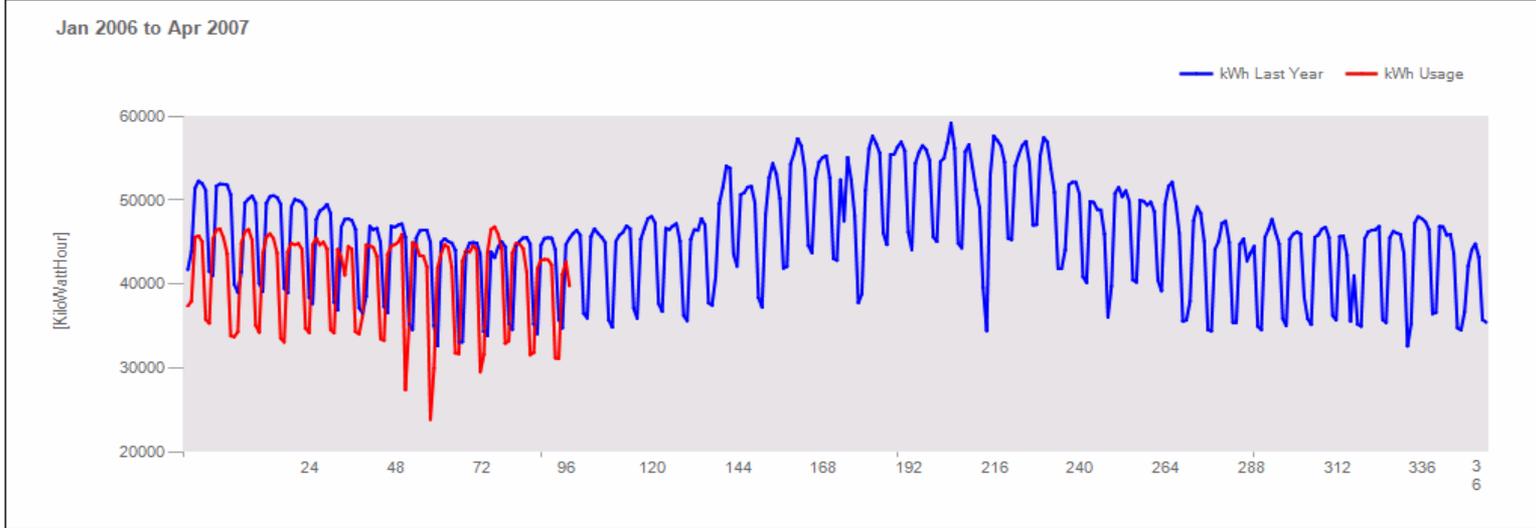
Example - Daily Usage Trend Check

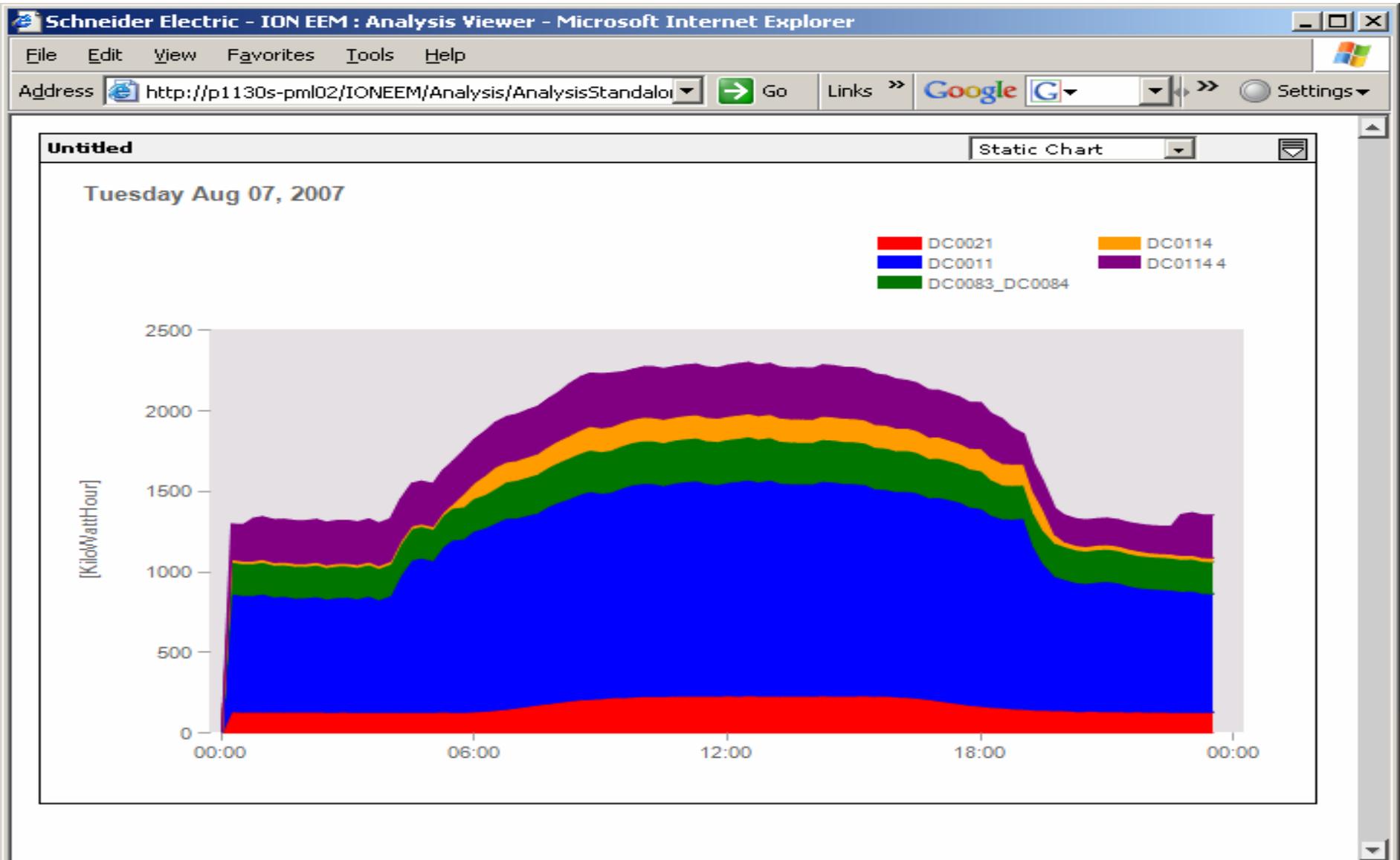
Static Chart



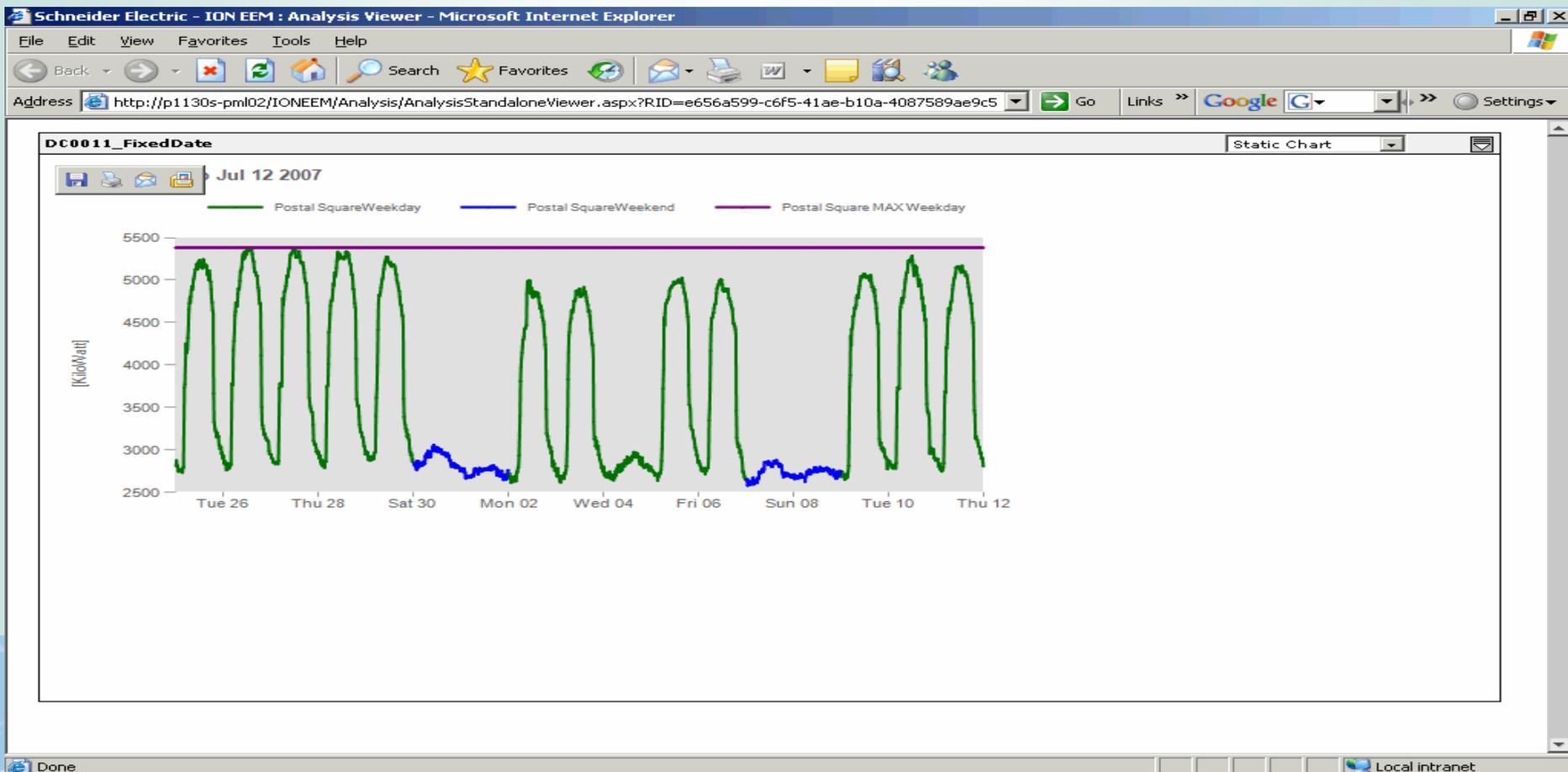
Example Year To Date

Static Chart





Real Life Example of Energy Savings!





Center For Energy Management



RENEWABLE ENERGY CERTIFICATE (REC) CONTRACTS						
<u>REGION</u>	<u>CONTRACTOR</u>	<u>TERM</u>	<u>Option</u>	<u>TOTAL</u>		<u>RESOURCE</u>
		<u>Mos.</u>	<u>Years</u>	<u>MWH</u>	<u>\$/MWH</u>	<u>TYPE</u>
New England (1)	3 Phases	12	2	25,402	\$1.0000	geothermal
Mid-Atlantic (3)	Calpine Energy Svc	12	1	50,000	\$0.4000	geothermal
Great Lakes (5)	3 Phases	12	0	60,000	\$0.4500	geothermal/
Heartland (6)	Calpine Energy Svc	12	1	45,000	\$0.3500	geothermal
Greater Southwest (7)	Calpine Energy Svc	12	1	26,000	\$0.6000	geothermal
Pacific Rim (9)				11,786	\$4.0000	
Northwest/Arctic (10)	Calpine Energy Svc	12	1	15,000	\$0.3500	geothermal
NCR (11)	Unicoi Energy Svc	12	0	75,000	\$0.4000	biomass
NCR (11)	Calpine Energy Svc	12	1	27,500	\$0.3500	geothermal
NCR (11)	Community Energy	37	0	11,216	\$11.5000	PJM new wind
(funded by EPA)						
NCR (11)	Pepco Energy Svcs	37	0	33,649	\$7.4000	PJM new biomass
(funded by EPA)						
World Bank	Wind Current	12	2	101,762	\$1.0000	90% wind/10% low impact hydro
Commerce	Calpine Energy Svc	12	1	85,715	\$0.3500	geothermal
DOE	Calpine Energy Svc	12	1	37,000	\$0.3500	geothermal
				605,030	\$1.1875	





DELIVERED RENEWABLE POWER CONTRACTS					Premium	
<u>REGION</u>	<u>CONTRACTOR</u>	<u>TERM</u>	<u>Option</u>	<u>TOTAL</u>	<u>Unknown</u>	<u>RESOURCE</u>
		<u>Mos.</u>	<u>Years</u>	<u>MWH/YR</u>	<u>\$/MWH</u>	<u>TYPE</u>
Northeast & Caribbean	Constellation NE & Pepco Energy Svcs	36	0	92,000		wind/biomass
Mid-Atlantic (3)	Green Mountain	36	0	3,000		wind/biomass
				95,000	\$0.0000	



What is Renewable Power?

- Renewable power is solar, wind, geothermal, biomass power, and now some hydro power
- DOE is responsible for the renewable definition
- Biomass is the broadest renewable category and includes, but is not limited to:
 - Landfill Gas
 - Municipal Waste-to-Energy
 - Wood Chips/Animal Waste to Energy
 - Crop Based Fuels



What is Green Power?

- Green power is a subset of renewable power
- The U.S. Federal Government does not define what green power is via legislation or E.O.
- EPA is responsible for the Green Power Partnership and has adopted green power definitions developed via a consensus approach (Green-e)
- Green-e's approach recognizes regional variation



Renewable vs. Green

- Hydro – some hydro will be considered renewable under Act (mainly incremental large/small), but small, low impact hydro considered green
- Biomass – waste (i.e. trash) to energy not considered green
- Biomass – U.S. Govt. defines biomass broadly and with no emissions criteria
- Biomass – Green-e has regional variation and regional emissions criteria
- Green-e has additional marketing requirements
- Green-e performs auditing function

Energy Comparison Graph

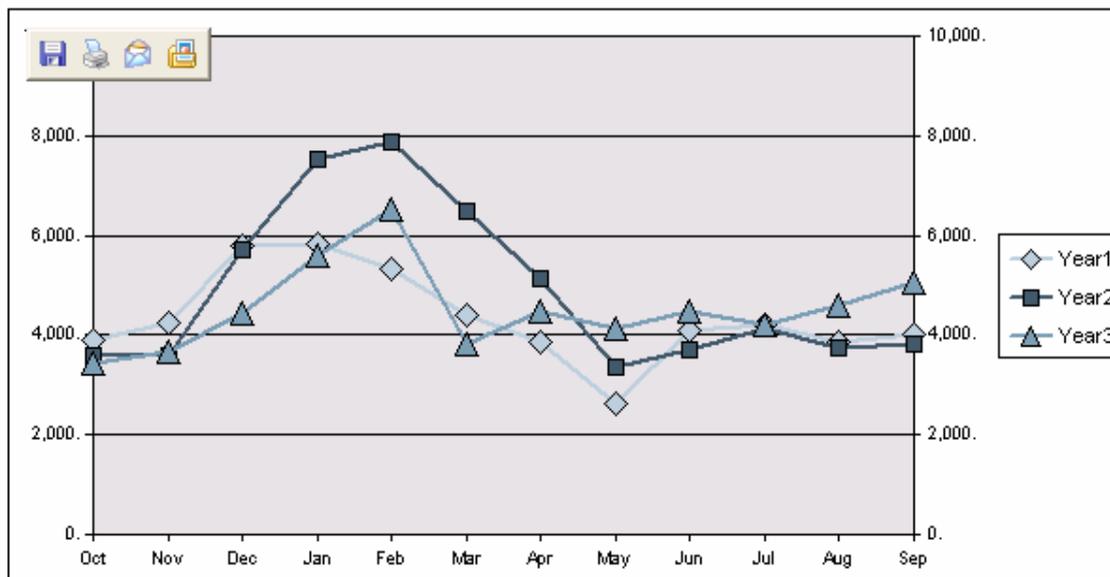
Show All Report Details

Region Summary for building categories : A
 Reporting Unit : mmbTUs, Energy Types : All Energy

Date : 12/1/2004
 Time : 11:15:46 AM

Year1 : Entire Fiscal Year 2004
 Year2 : Entire Fiscal Year 2000
 Year3 : Entire Fiscal Year 1985

Region :	11	Building Name :	FOB 6
Building :	DC0010ZZ	City :	WASHINGTON D C
Field Office :	7001 DC SERVICES DIVISION	Gross Space :	643,019
District :	DC SERVICES DIVISION	Category :	A



* For details on calculations please see help

Energy Performance (with weather data)

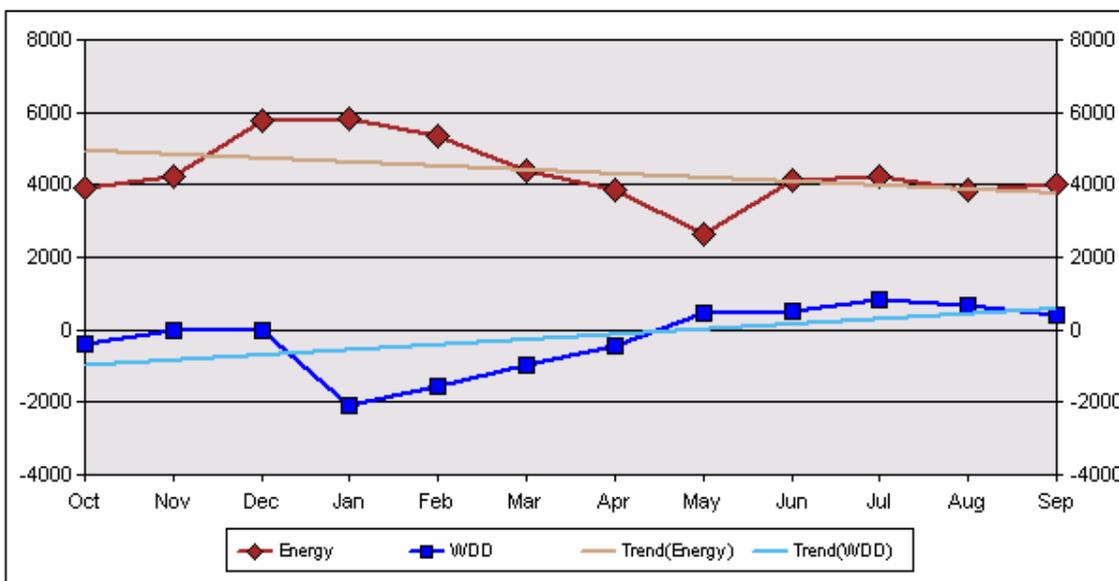
Region Summary for building categories : A

Region : 11

Date : 12/1/2004 Report for the period of Fiscal Year 2004

Time : 11:17:16 AM

Region :	11	Building Name :	FOB 6
Building :	DC0010ZZ	City :	WASHINGTON D C
Field Office :	7001 DC SERVICES DIVISION	Gross Space :	643,019
District :	DC SERVICES DIVISION	Category :	A





Actual vs. Simulated Power Consumption General Services Administration

Summary of Annualized Energy Consumption Data

	Annual Per PC Average	All 2,000 PCs
Baseline Energy Consumption	558.6 kWh	1,117,200 kWh
Energy Consumption with Surveyor	267.03 kWh	534,060 kWh
Energy SAVINGS	291.61 kWh	583,220 kWh
Greenhouse Gas Emission REDUCTION	319.61 lbs	639,220 lbs
Energy REDUCTION %	52.2 %	

Summary of Annualized Energy Costs

	Annual Per PC Average	All 2,000 PCs
Baseline Energy Cost	\$47.48	\$94,960.00
Energy Cost with Surveyor	\$22.70	\$45,400.00
Cost SAVINGS	\$24.79	\$49,580.00
Cost SAVINGS %	52.2 %	



Conclusion

For more details on any of these initiatives
please visit our website

www.gsa.gov/energy

Or call

(202) 708-9296

