



FAIRFAX COUNTY GOVERNMENT



A COMMITMENT TO ENERGY EFFICIENCY AND CONSERVATION

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Deputy County Executive

November 2009



WHO WE ARE

Fairfax County Government

- Residents – over 1 million
- Size – 400 square miles
- Governance – 10 elected Board members
 - 1 Elected-At-Large Chairman
 - 9 Supervisors representing specific districts
- County and School Operations
 - Budget (combined) – nearly \$6 billion
 - Employees (combined) – nearly 35,000



OUR ENERGY DEMANDS

Fairfax County Government

- County office buildings
- Public Safety facilities – 24/7 operation
 - Police and fire and rescue stations
 - Public Safety Transportation Operations Center
 - Adult Detention Center
- Courthouse complex
- Health and Human Service facilities



OUR ENERGY DEMANDS

Fairfax County Government

- Libraries
 - 8 regional and 14 community branches
- Parks and Recreation facilities
 - ReCenters, athletic fields, golf courses, and lakes
- Public Works facilities
 - Noman Cole wastewater treatment plant, I-95 Landfill Complex, I-66 Transfer Station



OUR ENERGY DEMANDS

Fairfax County Public Schools

- 12th largest school system in the U.S.
 - 197 schools and centers
 - About 173,500 students – 13% of all Virginia students
 - 22,137 employees
- Recognized leader in technology use for both instructional and administrative programs



Fairfax County Public Schools

[FCPS Home](#) [Site Index](#) [Contact Us](#) [Schools and Centers](#)



GUIDING PRINCIPLES

Employee Vision: How we view ourselves

- We are committed to excellence in our work. We celebrate public service, anticipate changing needs and respect diversity.
- We inspire integrity, pride, trust and respect within our organization.
- We encourage employee involvement and creativity to continually improve service.
- As *stewards of community resources*, we embrace the opportunities and challenges of technological advances, evolving demographics, urbanization, revitalization, and the changing role of government.



GUIDING PRINCIPLES

Core Purpose: Why does our government exist?

- To *protect and enrich the quality of life* for the people, neighborhoods, and diverse communities of Fairfax County



GUIDING PRINCIPLES

Sustainability Principles: Investments for the Future

- Maintaining Safe and Caring Communities
- Practicing Environmental Stewardship
- Building Livable Spaces
- Maintaining Healthy Economies
- Connecting People and Places
- Creating a Culture of Engagement



GUIDING PRINCIPLES

A Commitment to Environmental Protection and Conservation

- Chesapeake Bay Local Government Partner
- Environmental Coordinating Committee
- Environmental Quality Advisory Council
- Environmental Agenda and Environmental Improvement Program
- Cool Counties Initiative
- Energy Efficiency and Conservation Coordinating Committee



ENVIRONMENTAL COMMITMENT

Chesapeake Bay Partner

- The County is a certified Gold Chesapeake Bay Partner Community



- First certified in 1997, at program's inception, and again in 2004
- Fairfax County meets or exceeds 40 benchmarks that support the protection and restoration of the Bay's watershed
- County protects about 860 miles of stream



ENVIRONMENTAL COMMITMENT

Environmental Coordinating Committee

- A collaborative interagency management committee created in 1999
- Established to ensure an appropriate level of coordination and review of the County's environmental policies and initiatives
- Responsible for implementing the Board's Environmental Agenda



ENVIRONMENTAL COMMITMENT

Environmental Quality Advisory Council

- Appointed 14-member citizen group advises the Board on environmental matters
- EQAC's *Annual Report on the Environment* offers recommendations on a variety of environmental issues
 - Issues include air and water quality, stream valley protection, noise and light pollution, and the use and preservation of ecological resources
- EQAC provides a forum for citizen input on environmental issues



ENVIRONMENTAL COMMITMENT

Environmental Vision and Implementation

Board of Supervisors' Environmental Agenda



Adopted by the
Fairfax County Board of Supervisors
June 21, 2004

Revised March 26, 2007

Environmental Improvement Program

Fiscal Year 2009



Prepared by the
Environmental Coordinating Committee
for the
Fairfax County Board of Supervisors
September 2007



ENVIRONMENTAL COMMITMENT

Environmental Agenda

- An award-winning 20-year vision
- Original Agenda, adopted in 2004, included statement of policies in six theme areas
 - Growth and Land Use; Air Quality and Transportation; Water Quality; Solid Waste; Parks, Trails, and Open Space; and Environmental Stewardship
- Agenda revised in 2007 to include policies regarding Trees and Climate Change



ENVIRONMENTAL COMMITMENT

Environmental Improvement Program

- Comprehensive and coordinated strategy to address and support the goals and objectives of the Board's Environmental Agenda
 - Limited to County-funded environmental projects and initiatives
- A tool for making cross-organizational decisions regarding environmental investment planning and policy needs assessment



ENVIRONMENTAL COMMITMENT

Cool Counties Initiative



- Declaration signed in July 2007
- Pledge to achieve significant, measurable and sustainable reductions in county government greenhouse gas emissions
- Support regional development and attainment of emissions reductions targets
- Provides policy and program templates for taking concrete action in seven areas



ENVIRONMENTAL COMMITMENT

Cool Counties Initiative

- "Solution Areas:"
 - Energy efficiency
 - Renewable energy
 - Greening vehicle fleets and equipment
 - Land use
 - Transportation
 - Water conservation
 - Educational outreach





ENVIRONMENTAL COMMITMENT

Selected Environmental Recognitions and Awards

- National Association of Clean Water Agencies Platinum Peak Performance Award (2009) in recognition of the outstanding performance of the County's wastewater treatment plant in meeting federal pollution removal standards
- PTI Technology Solutions Award for Sustainability (2007-2008) for the County's plug-in hybrid vehicle fleet trial
- EPA Green Power Partner (2007) for green power purchasing
- EPA Community Partner of the Year Award (2005) for use of landfill gas as a renewable energy source
- National Association of Counties Achievement Award (2005) for improving air quality in the Washington metropolitan region – air quality protection strategy



ENVIRONMENTAL COMMITMENT

Energy Efficiency and Conservation Coordinating Committee

- Established in 2009 to advance the County's fiscal, social, and environmental stewardship goals by coordinating energy efficiency and conservation planning across County agencies, schools, and authorities and by disseminating information regarding energy efficiency and conservation to County employees, employers, and residents



ENERGY EFFICIENCY AND CONSERVATION COORDINATING COMMITTEE

Some Committee Responsibilities

- Ensure coordination of energy efficiency and conservation across County agencies, schools and authorities
- Review agencies' energy projects for evaluation and funding recommendations
- Assist with energy related initiatives as requested by the Board of Supervisors or County Executive



ENERGY EFFICIENCY AND CONSERVATION COORDINATING COMMITTEE

Broad Scope of Activities

- Facilitate cross-organizational education and collaboration
- Work closely with the County's Environmental Coordinating Committee (ECC) to advance the County's environmental goals
- Develop proposals for Board consideration that advance County energy objectives



ENERGY EFFICIENCY AND CONSERVATION COORDINATING COMMITTEE

Broad Scope of Activities

- Assisted the Board of Supervisors in drafting its first Energy Policy, which
 - promotes energy efficiency and conservation in County buildings, facilities, operations, and vehicles;
 - promotes energy efficiency and conservation practices among County employees, employers, and residents;
 - advances the goal of reducing energy consumption; and
 - supports the Board's Environmental Agenda and the Cool Counties Climate Stabilization Initiative.



REGULATORY ACTIVITIES

Public Utilities Branch

- Represents Board of Supervisors on public utility issues
 - Issues include energy, telephone, water, and taxis
- Advances interests of both consumers and County government
 - Participates in proceedings before the State Corporation Commission (SCC) involving regulated utilities
 - Negotiates contracts for electric service to government facilities through Virginia Energy Purchasing Governmental Association (VEPGA)



REGULATORY ACTIVITIES

The Branch is Increasingly Involved in Energy Efficiency and Conservation Issues

- Analyzing SCC applications involving “smart grid,” demand side management, and rate de-coupling
- Participating in the Metropolitan Washington Council of Government’s Energy Advisory Committee
- Serving as staff for the County’s Energy Efficiency and Conservation Coordinating Committee
- Reviewed over 70 energy bills introduced during the Virginia General Assembly’s 2009 session
- Filed comments with the SCC in 2008 advocating customer rights for renewable energy purchases
- Established fuel economy standards in 2008 for taxicabs operating in the County



ACCOMPLISHMENTS

Examples of the County's Energy Efficiency and Conservation Accomplishments

- Facilities Management
- Fairfax County Park Authority
- Vehicle Services
- Public Works and Environmental Services
- Information Technology
- Fairfax County Public Schools



ACCOMPLISHMENTS

Facilities Management Department

- FMD responsible for managing 180+ buildings
 - No responsibility for Schools, Parks, Housing, Public Works
- Operates and maintains over 8 million gross square feet (SF)
- Manages annual utility costs of approximately \$14 million



ACCOMPLISHMENTS

Where FMD Began –

- Established Energy Goal in FY2001 to reduce energy consumption and costs
 - Goal is 10% kBtu/SF reduction over 10 years, or an average annual reduction of 1%
- Determined baseline energy usage
- Implemented energy guidelines
- Began reviewing new building designs



ACCOMPLISHMENTS

Where FMD Began (cont'd) –

- Picked “low hanging fruit” with the help of Energy Services Companies (ESCOs)
- Began installing Energy Management Control Systems (EMCS)
 - EMCS can save 25-50% of energy consumption, depending on type of facility
 - Installed in 70+ existing buildings to date
 - Standard in new buildings



ACCOMPLISHMENTS

FMD's Government Center Retrofit

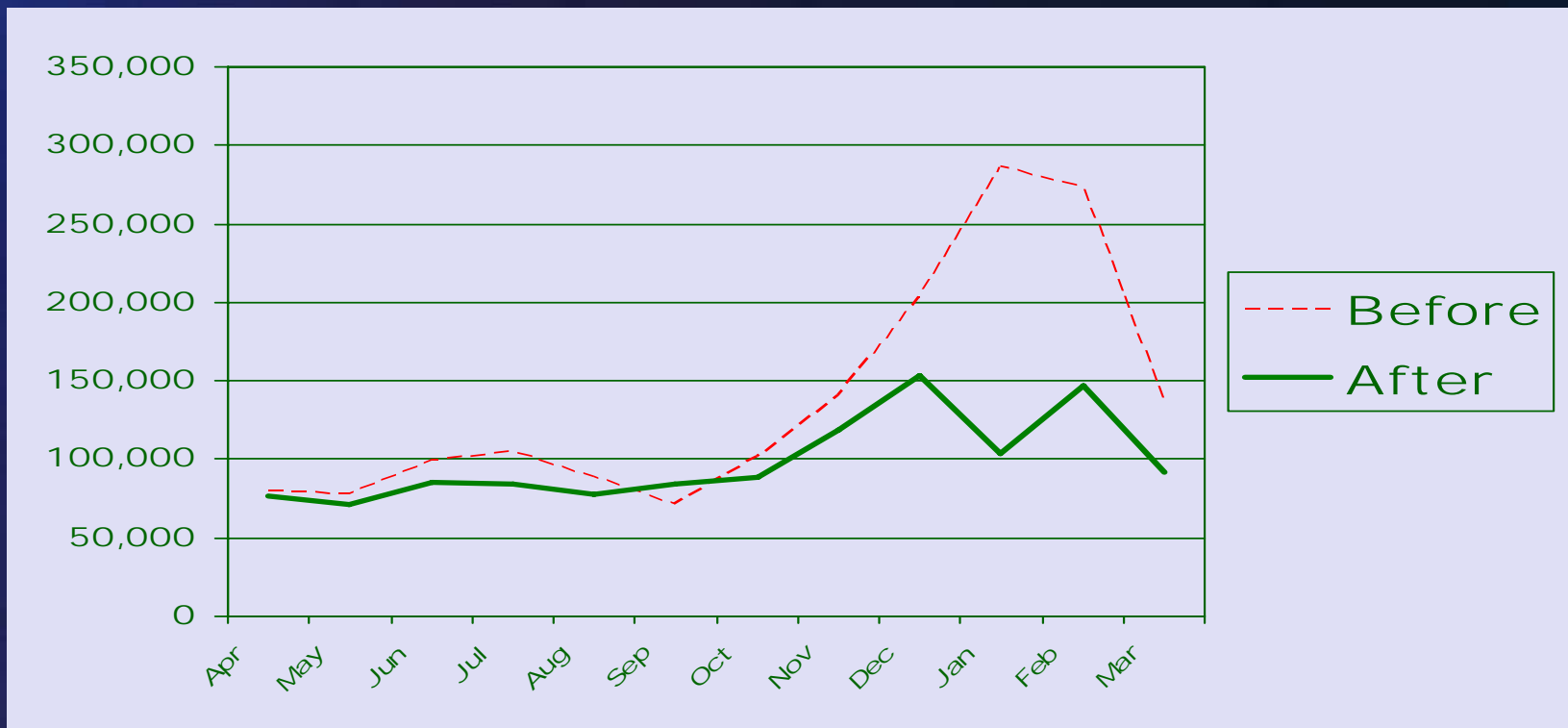
- Project included:
 - Retrofitting existing air handling units with variable frequency drives and energy efficient motors
 - Replacing all T12 32W fixtures with T8 28Ws
 - Upgrading lighting control software
- One-time cost of \$895,220 generates \$86,000 in annual energy savings
 - Payback period is 10 years – less than 7 if rising energy costs are considered
- Reduces CO₂ by 648 metric tons per year



Fairfax County
VIRGINIA

ACCOMPLISHMENTS

FMD's HVAC renovation at John Marshall Library saved 28.8% energy





ACCOMPLISHMENTS

FMD is Exceeding its Goal

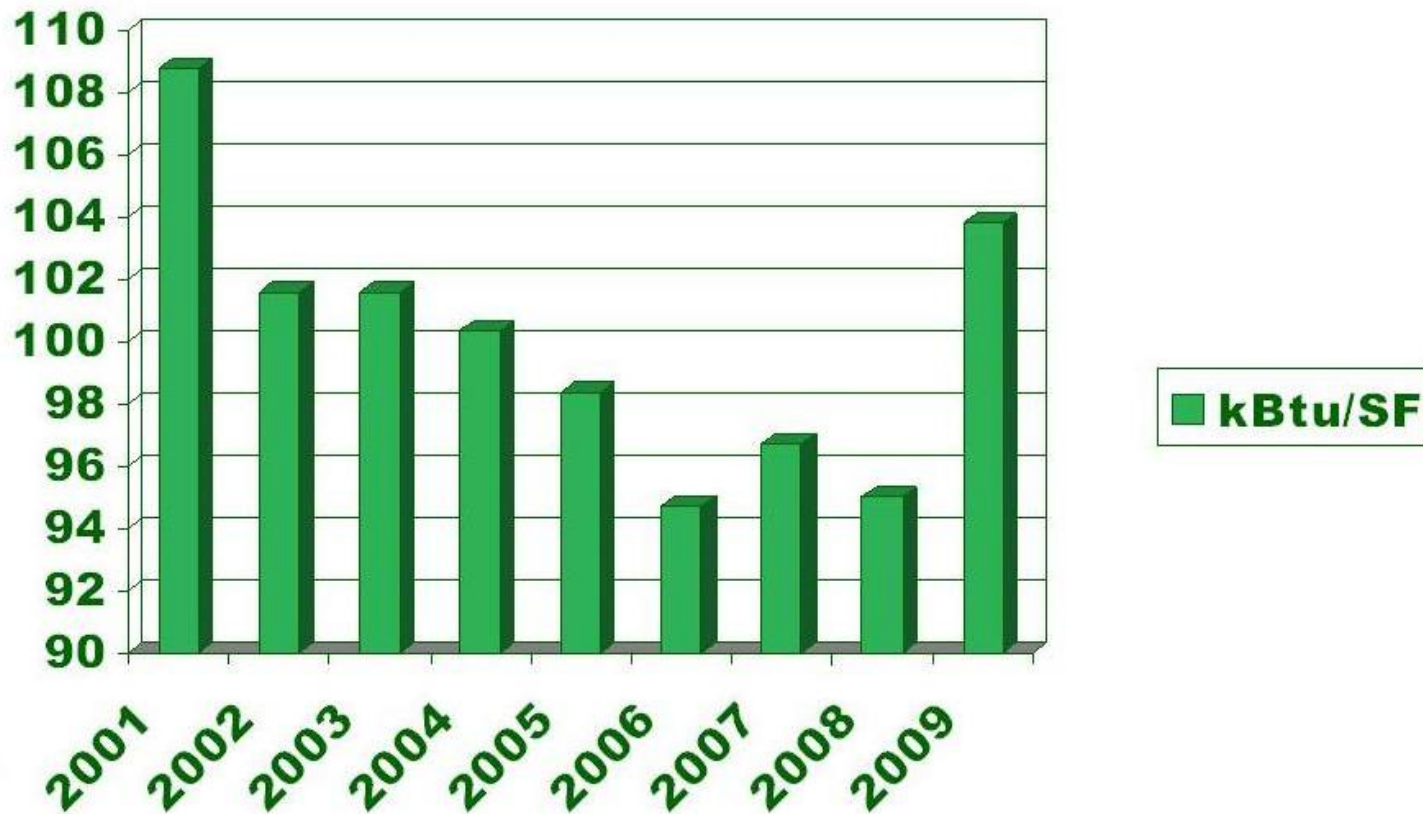
- Goal is an average 1% reduction/SF/year
 - 10% kBtu/SF reduction over 10 years
- Achieved an average annual reduction of 1.8% between FY2001 and FY2008
 - FMD reduced total kBtu/SF by 12.6%
 - Cost avoidance since 2001 exceeds \$6 million
 - In FY2009 overall consumption increased due to new buildings
 - Total reduction between FY2001 and FY2009 is 5.9%/SF



Fairfax County
VIRGINIA

ACCOMPLISHMENTS

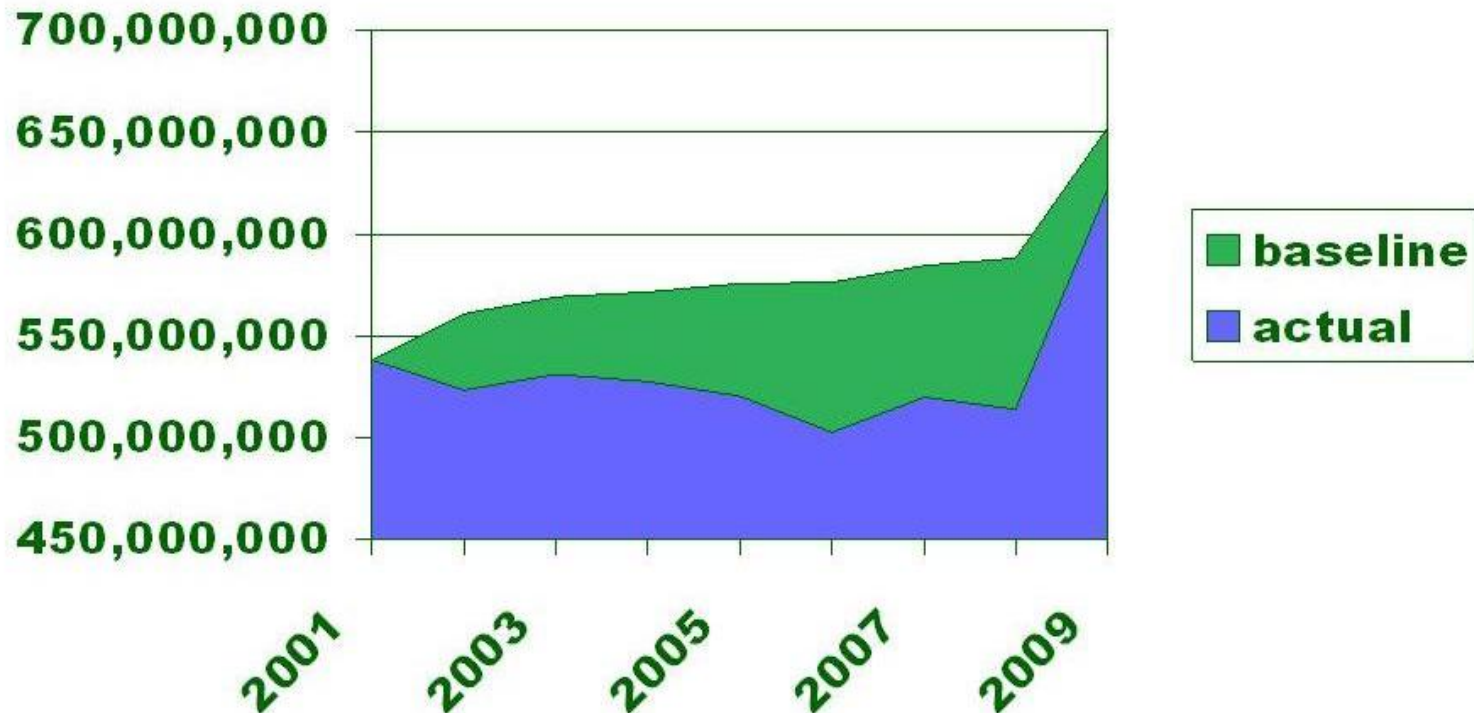
FMD: Consumption/Gross SF





ACCOMPLISHMENTS

FMD: Baseline v. Actual Consumption



Total cost avoidance since 2001 exceeds \$6.7 million



ACCOMPLISHMENTS

Fairfax County Park Authority (FCPA)

FCPA Manages approximately:

Outdoor

- 420 parks on 22,000 acres of land
- 289 athletic fields (99 lighted, 134 irrigated, and 57 lighted and irrigated)
- 409 tennis, basketball, and volleyball courts
- 310 miles trails
- 201 playgrounds
- 7 golf courses
- 3 lake front parks

Indoor

- 9 RECenters serving 1.7 million customers annually
include swimming pool, racquetball courts, fitness center,
gymnasium, ice rink, classrooms, and/or activity rooms
- 9 nature/visitor centers
- 67 historic sites



ACCOMPLISHMENTS

FCPA Facilities Energy Retrofits/projects

- Projects at FCPA facilities include:
 - Automated control of key mechanical systems and web-based control
 - Installation of high-efficiency motors and pumps
 - Installation of geothermal system
 - Lighting and related control system retrofits, including
 - T8, T5, LED, and CFL light fixtures and LED exit signs
 - Occupancy / ultrasonic sensors
 - Daylight harvesting control systems

- One-time cost of \$385,220 generates \$132,000 in annual energy savings
 - Payback period is 2.9 years



ACCOMPLISHMENTS

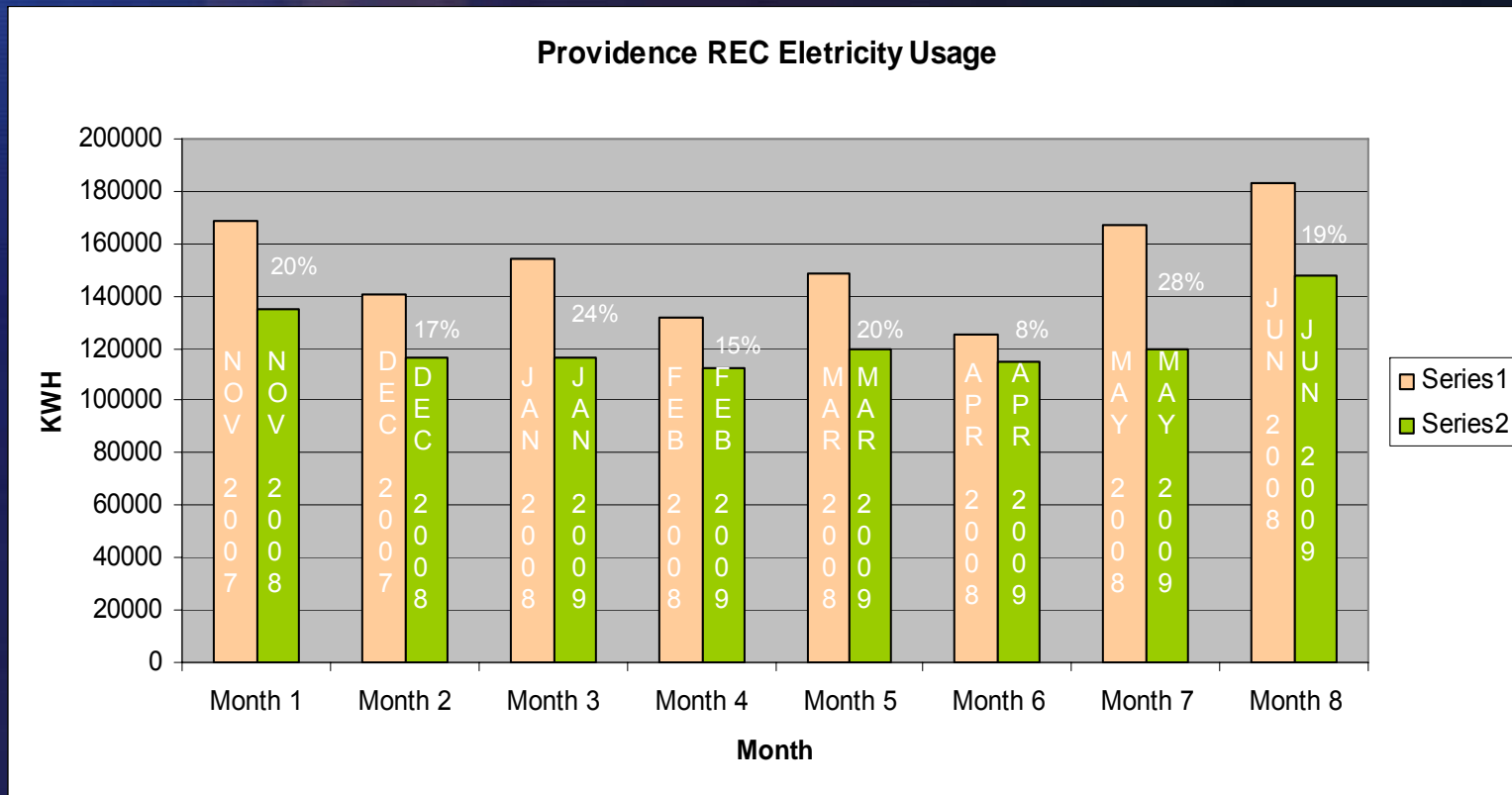
Lighting & Control Retrofit Results

Providence RECenter - Energy Management Retrofit Projects						
Retrofitted Areas	Previous Total KW	New Total KW	Previous Operation Hours a Year	New Operation Hours a Year with Sensor	Energy Saving	Estimated Payback Period (Years)
Swimming Pool and Spa	34.8	13.3	5800	5800	60%	2.7
Racquetball Courts	11.2	5.4	5800	2900	75%	2.2
Fitness Center	8.7	4.3	5800	5800	50%	1.5
Lobby and Hallway	6.6	2.6	5800	5800	61%	4.5
Offices and Activity Rooms (approximately)	4	4	5800	4600	20%	2.7
Total	65.3	29.6	29000	24900	61 % weighted average	2.9 weighted average



ACCOMPLISHMENTS

Total Electricity Usage in the facility



TOTAL KWH USAGE (NOV 2007 TO JUNE 2008) = 1,220,100

TOTAL KWH USAGE (NOV 2008 TO JUNE 2009) = 982,840

19.5 %



Fairfax County
VIRGINIA

ACCOMPLISHMENTS

Providence REC - Swimming Pool Lighting Upgrade - 58% saving

Before Upgrade



Foot-Candle: 8
KW: 34.8

After Upgrade



Foot-Candle: 20 to 30
KW: 13.3



Frying Pan farm - Visitor Center Parking Lot

Lighting and control upgrade - LED - 69% saving

Before Upgrade



KWh / Year: 5200

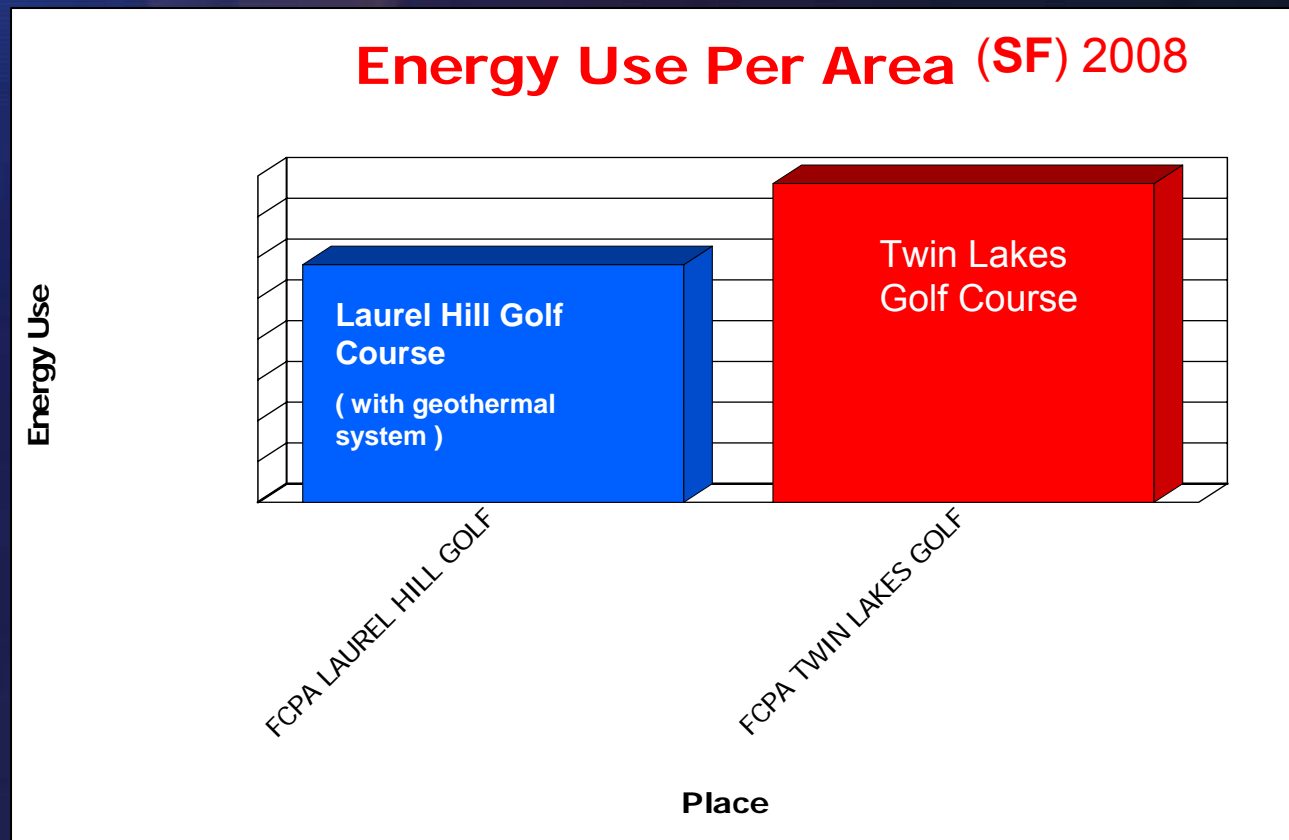
After Upgrade



KWh / Year: 1600



Golf Courses – Energy usage per SF 25% saving with geothermal system





ACCOMPLISHMENTS

Department of Vehicle Services

- DVS provides fleet management and maintenance services to the County and Schools
- Maintains about 5,700 vehicles including 1,580 school buses
- Operations include maintenance facilities and fuel sites



ACCOMPLISHMENTS

DVS Initiatives

- Idling reduction program
 - Automatic idle shut-off in refuse trucks
 - Battery A/C-Heater pilot project in transfer tractors
- Transmission programming pilot project



ACCOMPLISHMENTS

DVS Initiatives

Hybrid and all-electric vehicles

- 113 hybrids currently in County fleet, including one PHEV
- 4 Neighborhood electric vehicles
- Grant funding for one school bus and one refuse truck

<i>Fuel economy (current fleet)</i>	Small sedan	Medium sedan *	SUV	Heavy truck *
Hybrid	37.8	26.3	23.6	8.81
Non-hybrid	20.2	21.0	18.7	7.00
FE improvement	87%	25%	26%	26%

* Preliminary data limits reliability



ACCOMPLISHMENTS

Department of Public Works and Environmental Services

- Building permits
- Environment
- Public Works
- Stormwater Management
- Capital Projects
- Land Use/Development
- Recycling and Trash
- Wastewater Management



ACCOMPLISHMENTS

DPWES I-66 Landfill Gas-to-Energy

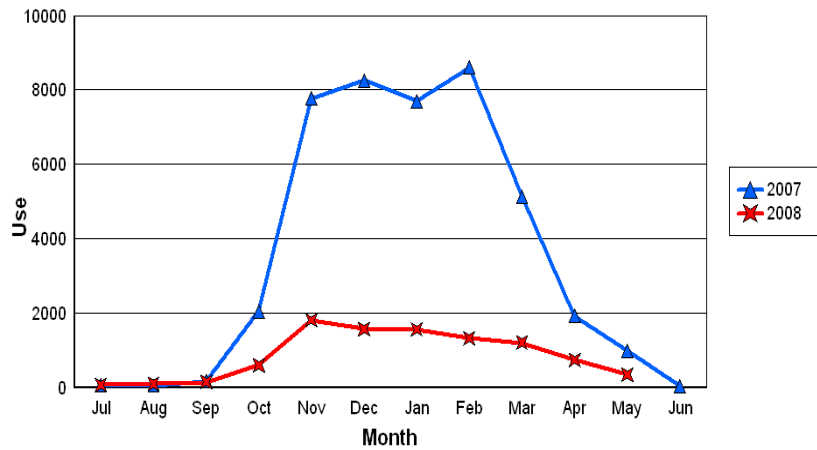
- Powers radiant heaters at DVS facility
 - Requires specialized heaters because landfill gas (LFG) has a 50% methane/50% CO₂ content
- One-time cost of \$300,000 actual savings from October 2008 to April 2009 was \$40,000
- LFG use reduces County's GHG emissions



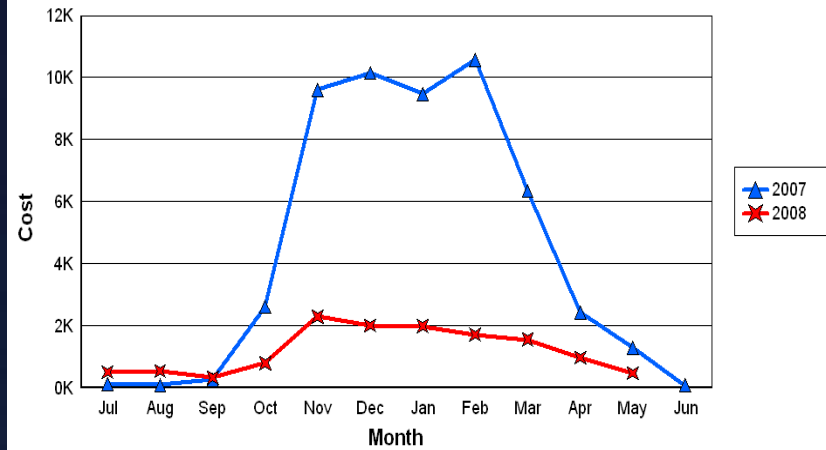
ACCOMPLISHMENTS

DPWES I-66 LFG Savings

Executive Energy Profile



Executive Cost Profile





ACCOMPLISHMENTS

DPWES I-95 Landfill Gas-to-Energy

- Project overview:
 - 350 gas wells drilled into the 500 acre landfill
 - Consumes 2,300 cubic feet/minute of LFG
 - Produces 6 megawatts of electric power – enough to serve 6,000 homes
- System energy savings equal to:
 - 600,000 barrels of oil per year
 - Removing emissions of 56,000 cars





ACCOMPLISHMENTS

Energy Resource Recovery Facility

- Owned and operated by Covanta Energy under contract to Fairfax County
- Combustion process can burn over 3,000 tons of solid municipal waste per day
- Generates enough electricity to power 75,000 homes
- Avoids equivalent of one million tons of GHG emissions annually

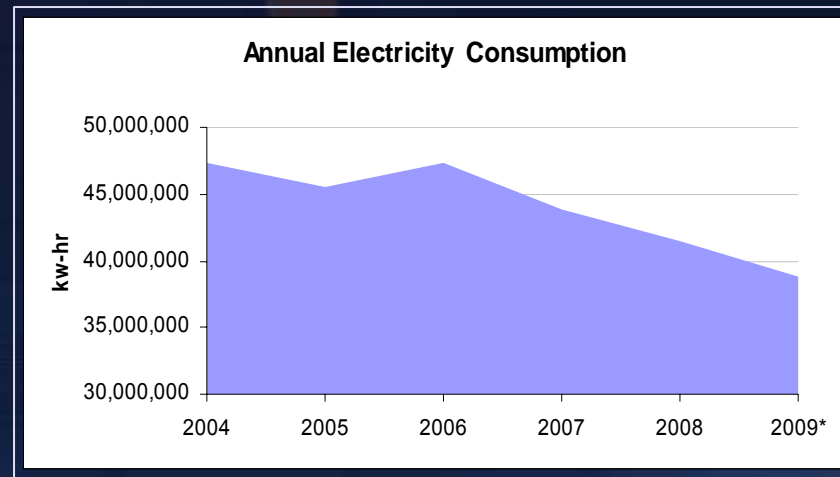




ACCOMPLISHMENTS

DPWES Noman M. Cole, Jr. Plant

- County wastewater treatment plant
 - Treatment capacity of 67 million gallons/day
- Electricity consumption has been reduced 18% since 2006





ACCOMPLISHMENTS

Energy Reductions at the Plant

- Revised work processes save electricity and money
 - Using one large blower, instead of two, saves 663,023 kWh and \$46,412 annually
- Energy-saving projects include:
 - Installing high efficiency lighting and pumps
 - Implementing power monitoring systems
 - Installing a solar-powered mixer in one of the plant's ponds, replacing four 25 hp mixers



Fairfax County
VIRGINIA

ACCOMPLISHMENTS

Solar Mixer at the Noman Cole Plant





ACCOMPLISHMENTS

DPWES' Noman M. Cole Jr. Plant

- Water reclamation incorporated into daily processes and on-site activities, where appropriate
- 2009 1st Q potable water consumption lowest since November 1990
 - Average daily consumption dropped by 87,000 gallons per day since 4th Q
 - Capacity savings equal to 200+ dwelling units



ACCOMPLISHMENTS

Department of Information Technology

- Projects include:
 - Server consolidation and virtualization
 - Implementation of NightWatchman (power management tool) for computers system-wide
 - Automatically powers off the desktops at night, then powers them on in the morning at a predetermined schedule
 - Estimated reduction of 40%-50% of power consumption and CO₂ emissions



ACCOMPLISHMENTS

Department of Information Technology NightWatchman Schedule

NightWatchman Schedule ± 1 hour on either/both side(s)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 AM	12 AM	12 AM	12 AM	12 AM	12 AM	12 AM
7 AM	7 AM	7 AM	7 AM	7 AM	7 AM	7 AM
6 PM	6 PM	6 PM	6 PM	6 PM	6 PM	6 PM
11 PM	11 PM	11 PM	11 PM	11 PM	11 PM	11 PM

NightWatchman Schedule color key: Yellow = On ; Grey = Off



ACCOMPLISHMENTS

Fairfax County Public Schools

- 240 buildings
- 26 million SF of space
- Energy and water budget about \$42 million
- FCPS Energy Management Program - since 1978



ACCOMPLISHMENTS

FCPS Energy Management

- Computerized Energy Management Control Systems
- Operating schedules coordinated with Web-based facility scheduler system
- High-efficiency lighting in nearly all buildings
- Building design conforms to the Collaborative for High Performance Schools (CHPS) standard
 - Both new buildings and renovations
 - CHPS standard more stringent than LEED for energy use



ACCOMPLISHMENTS

FCPS Energy Performance Contracts

- 107 buildings – 10.4 million SF
- Work done 2003 to 2006
- Lighting, windows, boilers, controls ,VFDs
- Investment of \$19.3 million generates estimated \$2.4 million annual energy savings



ACCOMPLISHMENTS

- E.P.A. Energy Star used to benchmark all schools
- Energy audits of buildings
- 1,847 energy accounts audited monthly
- Web-based controls
- Advanced meter reading in 112 schools
- 2 solar PV systems
- Solar hot water
- Cool roofs



FEDERAL STIMULUS FUNDING

Energy Efficiency and Conservation Block Grant (EECBG) Program

- Federal program allocated \$9.6 million to Fairfax County in 2009
- EECCC Selection Subcommittee solicited, reviewed, and recommended County projects for EECBG funding
 - County Executive approved final mix of projects
- Project list at www.fairfaxcounty.gov/recovery



FEDERAL STIMULUS FUNDING

19 Projects in Six Program Areas

- Capital improvements (HVAC, lighting, windows)
- Information technology energy efficiency
- Energy audits of County facilities and retro-commissioning
- Transportation projects (telework, hybrids)
- Education, outreach, and residential energy-audit rebates
- Greenhouse gas emissions inventory



FEDERAL STIMULUS FUNDING

Sample EECBG Project: IT Server Virtualization and Consolidation

- Enterprise system solution replaces 512 servers with eight servers
- Drastic reductions in power consumption and GHG emissions
 - Server power demands drop to about 12% of current demand (= 64 current servers)
 - Eliminates corresponding demands for cooling and auxiliary equipment
- Significant hardware and software savings



FEDERAL STIMULUS FUNDING

Enterprise System Solution									
# of Enterprise Systems	Hardware Cost (k)	Network Cost (k)	Storage Cost (k)	Windows OS License	Rack Costs (k)		Total Hardware/ Software Cost	Annual Electricity Usage by Enterprise Servers (kWh)	Annual Electricity Usage by Cooling Systems (kWh)
4	\$800	\$100	\$200	Included	\$8		\$1,208,000	\$52,560	\$52,560
6	\$1,200	\$150	\$300	Included	\$16		\$1,816,000	\$78,840	\$78,840
8	\$1,600	\$200	\$400	Included	\$16		\$2,416,000	\$105,120	\$105,120
Physical Dell PowerEdge Servers									
# of Physical Servers	Hardware Cost (k)	Network Cost (k)	Storage Cost (k)	Windows OS License	Rack Costs (k)		Total Hardware/ Software Cost	Annual Electricity Usage by Dell Servers (kWh)	Annual Electricity Usage by Cooling Systems (kWh)
256	\$2,048	\$100	\$200	\$384	\$128		\$2,860,000	\$852,173	\$852,173
384	\$3,072	\$150	\$300	\$576	\$192		\$4,290,000	\$1,278,259	\$1,278,259
512	\$4,096	\$200	\$400	\$768	\$256		\$5,720,000	\$1,704,346	\$1,704,346
Savings by Deploying Enterprise System Solution									
# of Enterprise Systems							Hardware Savings	Annual Electricity Savings (kWh)	Annual CO2 Emission Reduction (metric tons)
4							\$1,652,000	\$1,599,226	1,051
6							\$2,474,000	\$2,398,838	1,576
8							\$3,304,000	\$3,198,451	2,101



FAIRFAX COUNTY ***GOVERNMENT***

**Information about the County's
Environmental and Energy Programs
can be found on the Web at:**

www.fairfaxcounty.gov



FAIRFAX COUNTY GOVERNMENT

Questions?