



Office of Inspector General

September 2008
Report No. EVAL-08-005

**Energy Efficiency of the FDIC's Virginia
Square Facility and Information
Technology Data Center**

Office of Evaluations





DATE: September 24, 2008

MEMORANDUM TO: Arleas Upton Kea
Director, Division of Administration

Michael E. Bartell
Chief Information Officer and
Director, Division of Information Technology

FROM: [Signed]
Stephen M. Beard
Assistant Inspector General for
Evaluations and Management

SUBJECT: *Energy Efficiency of the FDIC's Virginia Square Facility and
Information Technology Data Center (Report No. EVAL-08-005)*

This report presents the results of the subject evaluation. As outlined in our engagement letter, our objective was to evaluate the Corporation's efforts to conserve energy in its operations of the Virginia Square facility, including the Student Residence Center and Information Technology (IT) data center and identify opportunities to further conserve energy and/or reduce utility costs. We engaged KPMG LLP (KPMG) to conduct this evaluation.

KPMG concluded that the FDIC has taken a number of actions to improve the energy efficiency of the Virginia Square facility and IT data center and identified leading practices that the FDIC has implemented that help reduce energy consumption and energy costs. KPMG identified opportunities to further improve the FDIC's energy management efforts and, in that regard, made five recommendations. Please refer to slides 2-4 for the overall evaluation results and slide 5 for a detailed discussion of the objective, scope, and approach.

KPMG has quantified the potential cost savings associated with several specific initiatives associated with the Virginia Square facility. We expect that the FDIC can achieve and sustain far greater savings over time by implementing the initiatives at all FDIC-owned buildings and by establishing a more programmatic and corporate-wide approach to energy management, as KPMG discusses in the report. However, implementing these initiatives will require additional investments, which we have not attempted to quantify. Consequently, we are not claiming monetary benefits resulting from the recommendations.

We presented a draft version of the report to your offices on August 6, 2008. The Division of Information Technology chose not to provide comments. The Division of Administration provided its response dated September 9, 2008, and concurred or partially concurred with the

recommendations and proposed responsive corrective actions. The response is included in Appendix VIII.

If you have any questions concerning this evaluation, please contact me at (703) 562-6352 or Marshall Gentry at (703) 562-6378.

Energy Efficiency of the FDIC's Virginia Square Facility and Information Technology Data Center

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Report Highlights



- The FDIC has taken a number of actions to improve energy efficiency of the Virginia Square (VASQ) facility and information technology (IT) data center. KPMG identified leading practices that the FDIC has implemented that help to reduce energy consumption, energy costs, and greenhouse gas emissions.
- KPMG identified qualitative and quantitative opportunities to further improve the FDIC's energy management and sustainability¹ efforts. We are making five recommendations in this regard:
 - Recommendations with Qualitative Benefits: The FDIC could benefit from developing a sustainability program to coordinate and measure progress made on the various energy management initiatives. KPMG identified other potential actions such as installing sub-metering and an energy management system that could help the Corporation more effectively monitor energy usage and identify areas for further review and potential cost savings.



¹The concept of sustainability encompasses ideas, aspirations, and values that continue to inspire public and private organizations to become better stewards of the environment and that promote positive economic growth and social objectives. The principles of sustainability can stimulate technological innovation, advance competitiveness, and improve our quality of life. (Source: Environmental Protection Agency)

Report Highlights



- Recommendations with Quantifiable Benefits: KPMG also identified improvements with estimated cost savings of \$145,667 or about 5.6% of the FDIC’s annual VASQ energy costs—not considering implementation costs. Potential savings for future years could be significantly greater as Dominion Virginia Power has petitioned the Virginia State Corporation Commission (VSCC) for a 31% increase in peak electrical rates for commercial customers. VSCC recently approved an 18% increase for residential customers effective July 1, 2008.



- These quantifiable initiatives equate to total potential electric savings of 3,772 megawatt hours (mWh) annually, which translates to 3,233 tons of CO₂ reductions. These reductions are equivalent to:
 - Taking 537 cars off the road for one year
 - Saving 667 pine forested acres

Report Highlights

- The FDIC negotiated favorable electrical rates by leveraging a U.S. Government Services Administration (GSA) master contract with Dominion Virginia Power. KPMG determined there are no utility-provided incentives presently available to the VASQ facility, but Virginia is considering them for adoption some time in the future. Utility incentives may be available in other states to offset capital expenditures associated with reducing energy consumption at other FDIC-owned facilities. (See Appendix IV for details regarding KPMG's analysis of the FDIC's utility procurements.)
- This report presents estimated savings for the VASQ facility only, which is a relatively new facility. Pursuing similar improvements, where practicable and appropriate, at other, older FDIC-owned facilities could result in far greater savings.

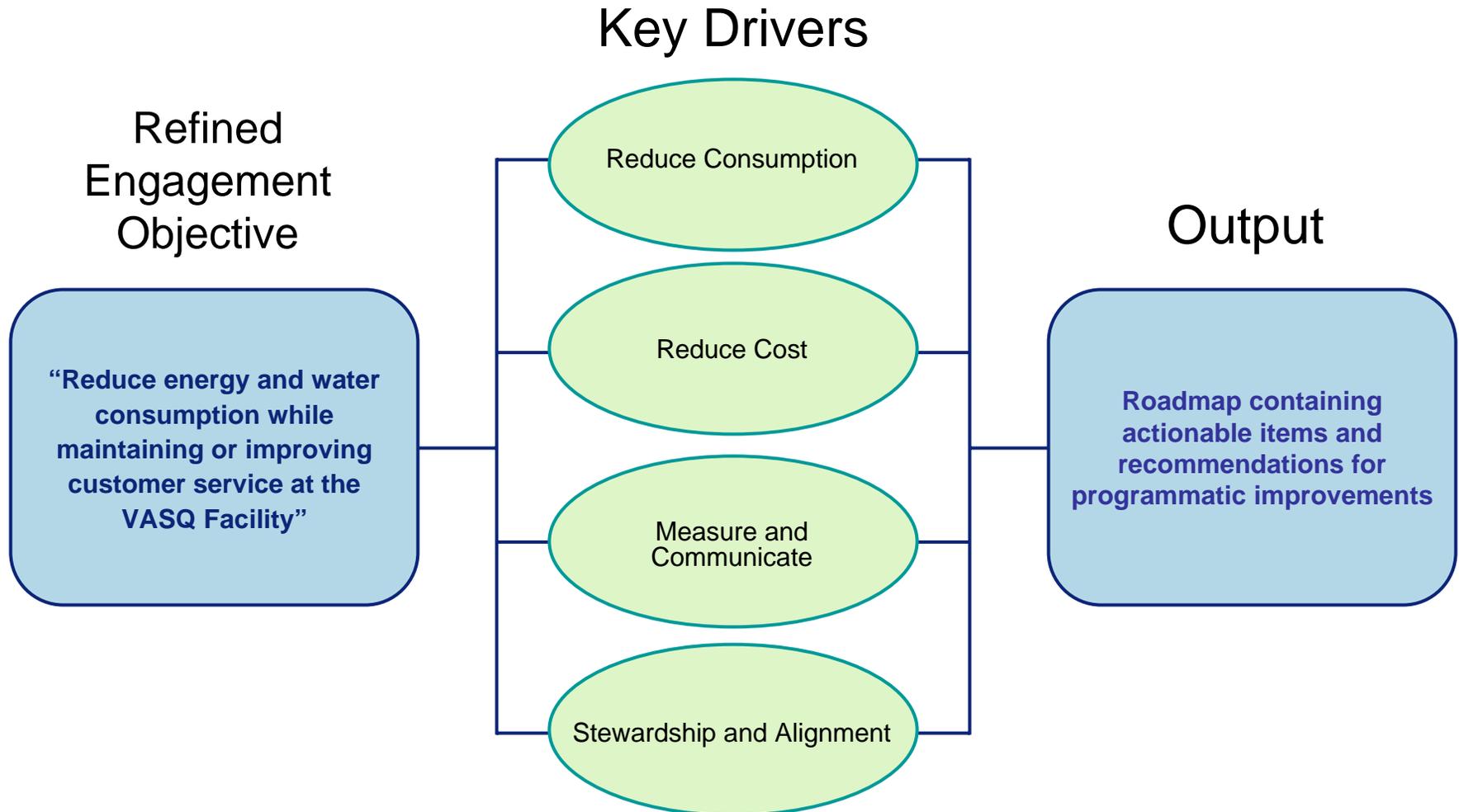
Objective, Scope, and Approach

- Engagement objectives were to (1) review the Corporation's efforts to conserve energy in its operation of the VASQ facility, including the Student Residence Center (SRC) and IT data center, and (2) identify opportunities to further conserve energy and/or reduce utilities cost.
- Through our interviews and tours, we worked with FDIC leadership and staff to refine the engagement objective, the desired outcomes, and intended benefits that could result from the assessment.
- Key considerations included:
 - The FDIC's stated objective of obtaining a LEED Silver Rating¹ for the VASQ campus
 - Identifying potential areas of cost savings while maintaining a high level of customer satisfaction
 - Providing insights for a programmatic approach to environmental management
 - Assessing the FDIC's energy management efforts against federal and industry guidance
 - Assessing operations and maintenance activities and approaches
- We conducted our work from April 2008 through July 2008 in accordance with the *Quality Standards for Inspections*.

¹ Leadership in Energy and Environmental Design (LEED®) Rating System – U.S. Green Building Council (USGBC) provides a rating system (Existing Buildings) focused on helping building owners and operators measure operations, improvements, and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. Source: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=221>, Appendix III, *Federal Agency Benchmarks*, provides a list of comparable Federal buildings that have achieved LEED certification.

Approach Overview

In conducting our work, we evaluated the FDIC's energy management efforts against four key drivers.



See Appendix I for additional discussion of KPMG's evaluation approach.

Important Disclosures

- Various factors and conditions will impact the FDIC's realization of savings, and they may differ from those achieved by other entities that have undergone similar energy management evaluations.
- KPMG utilized consumption and "Savings Calculators" principally from the Federal Energy Management Program (FEMP), EPA ENERGY STAR and WaterSense, Department of Energy, and other industry sources.
- KPMG obtained estimates using recommended values from the "Savings Calculators" to calculate potential savings. For calculations not covered under FEMP, KPMG used lower estimates from industry studies. To be conservative, KPMG has reported the "low" estimate throughout this report.
- KPMG relied upon an inventory of electrical devices provided by the Division of Information Technology (DIT) and the Division of Administration (DOA). KPMG did not validate the accuracy of the inventory.

Background



- The President signed Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, in January 2007 to improve Federal agencies' energy efficiency and to reduce greenhouse gas emissions. Appendix V provides additional details on Executive Order 13423.
- Like other Federal agencies, the FDIC impacts national greenhouse gas emissions through energy demand and consumption.
- Over the 15-month period from January 2007 to March 2008, the FDIC procured the following utility services for the VASQ facility.

Type of Utility Service	Amount	Cost
Electricity	40,361,160 kilowatt-hours (kWh)	\$2,130,084
Natural Gas	689,624 British Thermal Units (BTU)	\$948,420
Water and Sewer Services	39,469,000 gallons	\$234,579

- The FDIC's Virginia Square campus was constructed in two phases, during 1989-1991 and 2003-2006. The campus consists of an office building with office space and training facilities for FDIC employees, which houses the IT Data Center, and an SRC for students and instructors attending classes.
- The FDIC also owns older buildings in Washington, D.C., and San Francisco, California.

Status of the FDIC's Energy Management Efforts



- As an independent government agency, the FDIC is not required to implement the guidelines as mandated in EO 13423 *Strengthening Federal Environmental, Energy, and Transportation Management*, however, the Corporation is taking strides to make improvements in line with EO 13423 and to act as environmentally responsible government stewards by:
 - Undertaking the pursuit of LEED Silver Certification
 - Installing a “green roof” to reduce the heat island effect of buildings
 - Virtualizing 628 servers and replacing 99% of its CRT monitors with LCD monitors
 - Recycling rain water to irrigate VASQ lawn and plants
 - Upgrading the HVAC system with variable speed drives
 - Participating in a survey and hiring a contractor to evaluate the efficiency of certain aspects of IT operations
 - Tasking an Action Learning Team as part of the Senior Executive Leadership Core program to develop a business case for “Greening the FDIC”
- While the FDIC has many discrete, environmentally friendly projects, the Corporation could benefit from pursuing a more programmatic approach to energy management and sustainability.

“Green” Adoption Approach

KPMG’s approach evaluated the FDIC’s activities against the growth and maturity framework shown below.

Maintaining

Embed energy optimization into operations

- Adopt leading practices associated with **reducing consumption** of energy / water and creation of waste
- Continually review costs associated with energy, water and facility management to **reduce price points**
- Identify available **incentives and other financial offsets** (government, supply side, vendors, etc.)
- Use **existing optimization programs as a channel** to improve “greenness” – technology refresh, server virtualization, enterprise architecture and others

Enhancing

Overlay “Green” onto new solutions

- Drive **more efficient equipment** into the environment
- Increase usage of **energy design criteria** for new infrastructure solutions
- Establish **key performance measurements** associated with “going green”
- Increase **participation in industry bodies** (e.g., Integrated Energy Management Working Group)
- Implement enterprise Energy Management Systems

Corporate Investment

Adopt emerging technologies & approaches

- Play a **supporting role in corporate energy management** efforts
- Provide **recommendations & participate on further improving the FDIC’s green profile**, examples:
 - Securing **alternate energy channels**
 - Investments in **solar & co-generation**
- **Develop risk management plans for changes in federal guidance, federal acquisition policy, or other adverse event**

KPMG concluded that the FDIC is performing a mix of Maintaining and Enhancing activities.

Potential Qualitative Improvements

The table below presents the potential actions we identified with the most significant qualitative benefits.

Leading Practice
<p>Developing a formal Sustainability Program to include:</p> <ul style="list-style-type: none"> • Engagement and support from the senior-most levels of the Corporation. • Sufficient personnel to manage the program and to integrate divisional energy management and sustainability efforts. • Energy, water, waste, and emission management plans linked to future "Green" initiatives and short-, medium- and long-term actions. • Policies and procedures for selecting green initiatives for consideration and for implementing the sustainability program. • Program baselines, key performance indicators, and evaluation approaches for measuring progress.
Adopting electricity, gas, and water metering (sub-metering).
Installing an energy management system (Operations, Maintenance, and Measurement of Benefits).
Increasing employee awareness by establishing internal & external communications of current green practices and strategy.
Connecting collected rain water and storm water to a gray water system.
Adopting WaterSense cost reduction techniques (purchasing non-potable vs. potable water).
Revising procurement policy to only acquire EPEAT or ENERGY STAR-rated equipment such as fax machines, copiers, laser printers, water coolers, food dispensers, clothes washers, commercial dishwashers, vending machines, commercial ice machines, community refrigerators and SRC refrigerators.
Expanding Virtualization of Windows Servers (Vmotion).
Continuing pursuit of a "lights out" data center.
Continuing to explore space consolidation in the IT data center.
Continuing efforts to seal and permanently close exterior windows in the SRC to conserve energy, regulate building pressurization and humidity issues, and prevent instances of mold.

For a complete listing of potential actions, please see the detailed Roadmap provided as Appendix II.

Potential Quantifiable Improvements

The following table presents the potential actions with the most significant quantifiable benefits that the FDIC should consider. However, cost of implementation and the associated payback period should be considered before initiating these actions.

Leading Practice	Annual Savings	Division
Continuing to activate sleep mode functionality for PCs.	\$ 24,754	DIT
Continuing investigation of temperature increase for the IT data center.	\$ 10,638	DIT
Exploring focused cold air ducting under raised floor and hot air ducting in the ceiling as a return vent for hot aisle / cold aisle efficiency.	\$ 13,297	DOA
Replacing Exit Signs with photo luminescent ability per fire marshal and code / compliance guidance.	\$ 12,531	DOA
Replacing T12 lights in SRC, A, & B Buildings w/ T8 lights (est. 10,500 tubes)—includes the IT data center.	\$ 15,750	DOA
Procuring only EPEAT or ENERGY STAR-rated equipment (FAX, Laser Printers and Copiers).	\$21,891	DIT
Procuring ENERGY STAR-rated devices: includes Water Coolers, Food Holding, Clothes Washers, Commercial Dishwashers, Vending Machines, Commercial Ice Machines, Commercial Refrigerators and Residential Refrigerators.	\$ 5,307	DOA
Retrofitting low-flow WasterSense faucets and shower heads.	\$ 30,561	DOA
Retrofitting toilets from 3.5 gallons per flush (gpf) to 1.6 gpf.	\$ 7,950	DOA
Retrofitting waterless urinals throughout the VASQ facility.	\$ 2,988	DOA
TOTAL	\$145,667	

For a complete listing of potential actions, please see the detailed Roadmap provided as Appendix II.

Factors Necessary for Change Realization



Senior-Level Management Sponsorship

- Currently, most “Green” initiatives are being driven independently within divisions. For the FDIC to continue moving forward synergistically, senior-level management sponsorship will be required.

Program, Policy & Procedure Standardization

- Past corporate efforts and the current state have identified a need for strategic awareness, corporate-wide planning, documentation, and guidance that provides for a programmatic approach that both mitigates constraints and enables performance improvement opportunities. Measurable goals should be identified to enable the FDIC to move beyond awareness and realize strategically-planned objectives.

Organizational Cooperation Across Multiple Verticals

- Real savings will require adopting a total lifecycle governance model – from facilities operations, space management, acquisition services, and IT infrastructure services. These organizations impact electricity, gas, and water requirements and consumption.

Asset and Operational Management (Continuous Monitor)

- Current-state capability could be improved to track assets and the facility appliance inventory at an itemized level. Without a complete inventory, intelligent management and monitoring of utility requirements and consumption is difficult due to the lack of sub-metering and other operational and communication challenges.

The Way Ahead

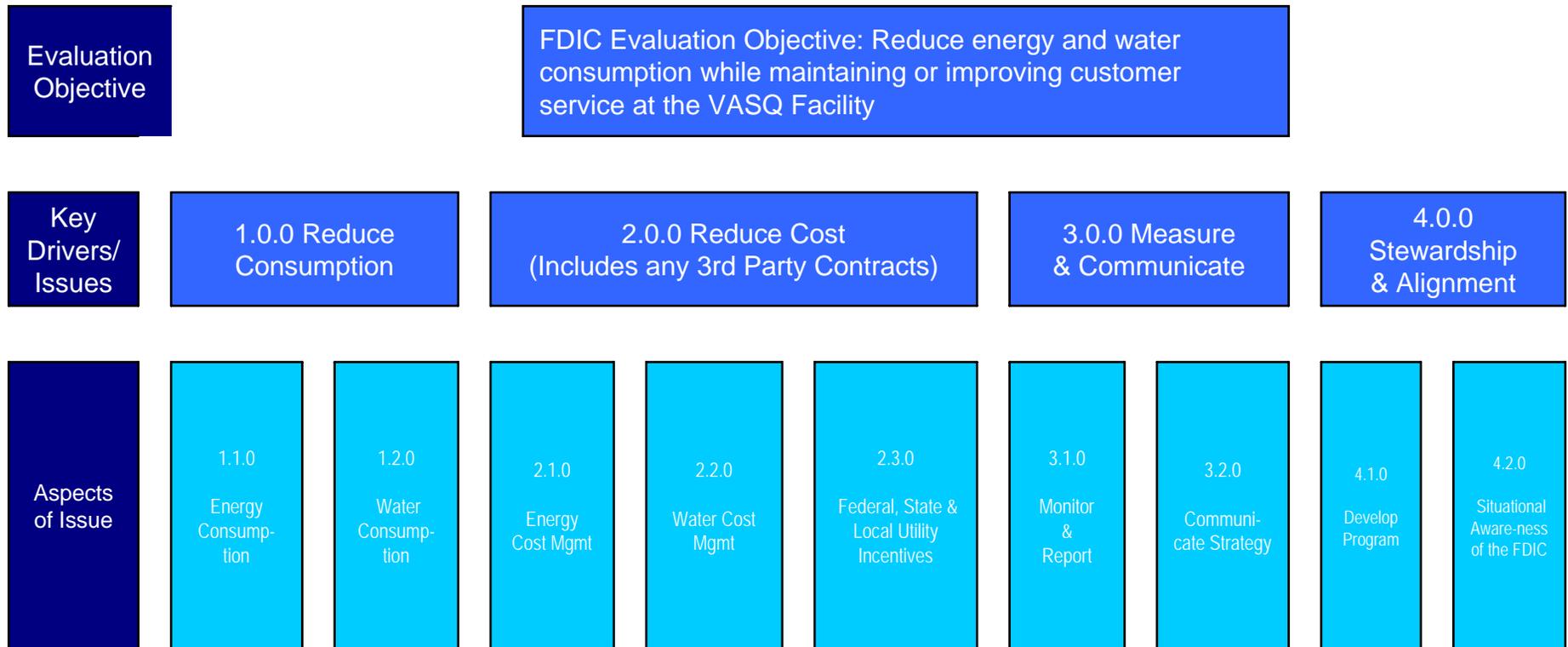
We recommend that the Director, Division of Administration:

1. Develop a formal Sustainability Program to include:
 - Senior-level management commitment and sponsorship in support of energy management and sustainability initiatives. DOA, in consultation with DIT, should also consider establishing an interdivisional performance metric, such as a Corporate Performance Objective, related to sustainability.
 - Sufficient personnel to manage the program and to integrate divisional energy management efforts.
 - Energy, water, waste, and emission management plans linked to future “green” initiatives and short-, medium- and long-term actions.
 - Policies and procedures for selecting green initiatives for consideration, procuring energy-efficient products, and for implementing the sustainability program.
 - Program baselines, key performance indicators, and evaluation approaches for measuring progress.
2. Improve the facilities infrastructure for monitoring energy management and sustainability efforts by
 - Installing or upgrading building energy management systems.
 - Installing sub-metering capabilities to monitor specific uses of energy.
3. Develop a communication strategy and campaign to increase employee awareness and acceptance of energy savings initiatives and efforts.
4. Assemble a team or assign resources to further study potential energy management improvements discussed on slides 11 and 12 of this report.
5. Evaluate energy management initiatives discussed in this report for applicability and consideration at other FDIC-owned and leased facilities.

Corporation Comments and OIG Evaluation

- On August 6, 2008, we provided a draft of this report to FDIC management for review and comment.
- DIT chose not to provide comments.
- DOA provided a written response, dated September 9, 2008. DOA's response is presented in its entirety in Appendix VIII on slides 33 and 34. DOA concurred or partially concurred with all five of our recommendations.
- DOA's actions are responsive to the recommendations. Appendix IX on slides 35 and 36 contains a summary of management's responses to the recommendations.

Appendix I: KPMG's Strategy Framework



Note: Each box on the Strategy Framework corresponds to actions listed on the Roadmap in Appendix II.

Appendix II: Roadmap

Roadmap (Virginia Square ONLY) Data Capture				FDIC Performing = greater than 75% complete and/or less than \$4K savings opportunity		
				Initial <50% ●	FDIC Performing ★	
				In process 50%-75% ●●	Savings enabler \$	
				Complete >75% ●●●	Process enabler ⚠	
Key Driver	Issue	Recommendation Area	Specific Action	Status/Complete	IT	Facilities
					Opportunity Sub Total	Opportunity Sub Total
Reduce Consumption	Energy Consumption	Adopt IT, Data Center & Facility Operations Leading Practices	Removing unused Windows and Unix Servers	●●●	★	
			Consolidating Servers through Virtualization	●●●	★	
			Incorporating CPU power stepping	●●●	★	
			Migrating CRT monitors to LCD	●●●	★	
			Performing Application Rationalization	●●●	★	
			Evaluating EOSL replacement to incorporate energy efficient equipment	●●●	★	
			Conducting batch processing at night (exploring near real-time processing)	●●●	★	
			Defining energy efficient enterprise target architecture	●●●	★	
			Centralizing printers/copiers	●●●	★	
			Performing computer rack cooling study for VASQ	●●	★	
			Installing more efficient power supplies	●	★	
			Grouping hardware to dissipate heat signature	●●	★	
			Expanding Virtualization of Windows Servers (VMotion)	●●	\$	
			Continuing pursuit of lights out data center	●●	\$	
			Continuing to explore space consolidation in data center	●	\$	
			Continuing enhancing computers in sleep mode	●●●	24,754	
			Continuing investigation of temperature increase for data center	●●	10,638	
			Exploring AC/DC conversion for direct DC power to hardware	●●●	★	★
			Enhancing system provision process and procedures to incorporate green elements	●●●	★	★
			Installing rack blanks in computer cabinets	●●	\$	\$
			Monitoring and rightsizing computer room AC units to optimize capacity	●●●		★
			Implementing hot aisle/cold aisle	●●●		★
			Exploring UPS upgrades	●●●		★
			Reducing distance from CRAC units to high heat/load intensive areas	●●●		★
			Performing air pressure optimization of air in transit	●●		★
			Exploring single I to phase III power	●●●		★
			Installing motion detection switches for turning lights off in VASQ	●●		★
			Rebalancing air handling system after significant IT reconfigurations	●●		★
			Improving cooling towers' efficiency	●●●		★
			Installing double doors into the data center	●		\$
Optimizing the chilled water to recommended specifications	●●					

Appendix II: Roadmap (continued)

Roadmap (Virginia Square ONLY) Data Capture				FDIC Performing = greater than 75% complete and/or less than \$4K savings opportunity		
				Initial <50% ●	FDIC Performing ★	
				In process 50%-75% ●●	Savings enabler \$	
				Complete >75% ●●●	Process enabler ⚠	
Key Driver	Issue	Recommendation Area	Specific Action	Status/Complete	IT Opportunity Sub Total	Facilities Opportunity Sub Total
Reduce Consumption	Energy Consumption	Adopt IT, DC & Facility Operations Leading Practices	Exploring focused cold air ducting under raised floor, sealing floor and hot air ducting in the ceiling as return vent for hot aisle/cold aisle efficiency	●		13,297
			Replacing exit signs with photo luminescent per fire marshal and code / compliance guidance	●		12,531
			Exploring the closure of SRC windows to better enable positive pressure	●		\$
			Replacing T12 lights in SRC, A, & B Buildings w/ T8 lights (est. 10,500 tubes) - includes Data Center	●		15,750
			Exploring acquisition and replacement of current Student Resident Center AC units with packaged terminal air conditioner (PTAC) units (ASHRAE 90.1-2001 & Arlington Code / Compliance)	●		\$
			Exploring acquisition of desiccant dehumidifiers for SRC and A & B building (active & passive models)	●		\$
			Procuring only EPEAT or Energy Star rated equipment (FAX, Laser Printers and Copiers)	●		21,891
			Improving and upgrading HVAC system with variable speed drives	●●●		★
			Procuring Energy Star Rated devices: includes (Water Coolers, Food Holding, Clothes Washer, Commercial Dishwashers, Vending Machines, Commercial Ice Machines, Commercial Refrigerators. and Residential Refrigerators.)	●		5,307
	<i>Sub Total</i>				35,392	68,776
	Water Consumption	Adopt IT, DC & Facility Operations Leading Practices	Repairing of sweating and leaking pipes	●●●		★
			Recycling water (gray water and processing recycling systems), currently 50% non-potable use	●●		★
			Connecting collected rain water and storm water to gray water system; LEED credit 5.1 @ 25% usage, additional credit 5.2 @ 50% usage	●		\$
			Exploring use of non-potable water in cooling tower	●		\$
			Exploring WaterSense conservation measures and management	●		⚠
Retrofitting low-flow WaterSense faucets and shower heads			●		30,561	
Retrofitting toilets from 3.5 gallons per flush (gpf) to 1.6gpf			●		7,950	
Retrofitting waterless urinals throughout FDIC VASO	●		2,988			
Reviewing contract for landscape and irrigation (WaterSense qualification requirement)	●		⚠			
<i>Sub Total</i>					41,499	

Appendix II: Roadmap (continued)

Roadmap (Virginia Square ONLY) Data Capture				FDIC Performing = greater than 75% complete and/or less than \$4K savings opportunity		
				Initial <50% ●	FDIC Performing ★	
				In process 50%-75% ●●	Savings enabler \$	
				Complete >75% ●●●	Process enabler ☞	
Key Driver	Issue	Recommendation Area	Specific Action	Status/Complete	IT	Facilities
					Opportunity Sub Total	Opportunity Sub Total
Reduce Cost	Energy Cost	Optimize Rates and Procedures	Volunteering to be included in energy load research	●		☞
			Analyzing data from automated meter reading equipment and load research	●		☞
			Purchasing electricity measurement equipment and systems	●		\$
			Evaluating business cases for modern energy management controls (Thermal Comfort Monitoring, System-Level Metering, Building Automation System)	●		☞
			Selling electricity to utility using new and/or existing generation	●		★
	<i>Sub Total</i>					0
Reduce Cost	Water Cost	Optimize Rates and Procedures	Adopting WaterSense cost-reduction techniques (purchasing non-potable vs. potable)	●		☞
				●		
	<i>Sub Total</i>					0
Reduce Cost	Federal, State & Local, Utility Incentives	Optimize Federal Tax Incentives	N/A - FDIC is not eligible for existing Federal income tax incentives for renewables			
	<i>Sub Total</i>					Qualitative
Measure & Communicate	Monitoring. & Reporting	Establish Monitoring and Reporting Program	Establishing a self-reporting program	●	☞	☞
			Establishing a baseline and continuous monitoring	●	☞	☞
			Establishing and adopting Key Performance Indicators	●	☞	☞
			Adopting electricity metering (sub-metering)	●●		☞
			Defining operational-level measurement methods and techniques	●	☞	☞
	Monitoring energy consumption of all IT hardware	●●		☞		
	<i>Sub Total</i>					Qualitative
Measure & Communicate	Communication Strategy	Establish a Communication Program	Establishing internal & external communication of current green practices and strategy	●	☞	☞
			Increasing leadership & collaboration with government, guiding organizations, and industry	●	☞	☞
			Providing training and insight to manage and reduce costs without driving up capital investment budgets	●		☞
			Providing information and training that informs shareholders, stakeholders, and contractors	●		☞
<i>Sub Total</i>			Increasing awareness of telecommuting and bike racks	●●●	★	★
					Qualitative	Qualitative

Appendix II: Roadmap (continued)

Roadmap (Virginia Square ONLY) Data Capture				FDIC Performing = greater than 75% complete and/or less than \$4K savings opportunity		
				Initial <50% ●	FDIC Performing ★	
				In process 50%-75% ●●	Savings enabler \$	
				Complete >75% ●●●	Process enabler Ⓢ	
Key Driver	Issue	Recommendation Area	Specific Action	Status/Complete	IT Opportunity Sub Total	Facilities Opportunity Sub Total
Stewardship & Alignment	Develop Program	Change Management	Adopting an entity-level strategic framework	●	Ⓢ	Ⓢ
			Developing energy, water, waste, emission management plans linked to any future "Green" initiatives	●	Ⓢ	Ⓢ
			Developing standard project selection criteria for "Green" initiatives	●	Ⓢ	Ⓢ
			Developing continuous improvement programs with goals	●	Ⓢ	Ⓢ
			Monitoring and integrating energy price trends	●	Ⓢ	Ⓢ
			Monitoring and integrating regulatory trends (taxation, caps, incentives or contract vehicles)	●	Ⓢ	Ⓢ
			Monitoring customer and social preference trends	●	Ⓢ	Ⓢ
			Adopting and integrating Whole Building Operations/Maintenance and LEED leading practices:	●	Ⓢ	Ⓢ
			<i>Protecting natural habitat, waterways, and water supply from pollutants carried by building discharge water</i>	●●●		★
			<i>Reducing the heat island of roof (Green Roof) 50% or more required for LEED certification and points</i>	●●●		★
			<i>Incorporating public transportation proximity in planning</i>	●●●		★
			<i>Establishing "Green" cleaning policy and program</i>	●●●		★
			<i>Recycling and reuse of materials - re-sell all equipment (except hard drives)</i>	●●●		★
			<i>Capital investments designed for energy efficiencies (e.g., SRC re-facing)</i>	●●●		★
			<i>Developing and incorporating a sustainable purchasing policy</i>	●		Ⓢ
<i>Creating a Resource Efficiency Manager position or assignment of tasks (1 FTE position)</i>	●●●		★			
<i>Transforming from reactive/preventive to predictive/reliability-centered maintenance management strategy</i>	●●		Ⓢ			
<i>Sub Total</i>					Qualitative	Qualitative
	Situational Awareness of FDIC	Monitor Government Guidance	Evaluating trends, roadmap, and adjustment of strategy	●	Ⓢ	Ⓢ
			Developing policies that address applicability and compliance with sustainability	●	Ⓢ	Ⓢ
			Developing a change management training program	●	Ⓢ	Ⓢ
	<i>Sub Total</i>					Qualitative
	Grand-Total				\$ 35,392	\$ 110,275

Appendix III: Federal Agency Benchmarks

KPMG selected the following Federal buildings as examples of Federal buildings achieving LEED certification in the Washington, DC metro area.

Federal Building Projects Registered for LEED® Certification Partial Listing							Updated: 31 Mar 08	
Agency	Project Name	City	State	System	Ver.	Gross SF	Reg. Date	
Dept of Agriculture with General Services Administration	USDA Headquarters Modernization: South	Washington	DC	LEED NC	2	2,000,000	8-Nov-01	
Dept of Commerce with General Services Administration	Hoover Building Modernization	Washington	DC	LEED NC	2.1	1,767,671	28-Oct-05	
General Services Administration	GSA 1800 F	Washington	DC	LEED NC	2.1	855,664	15-Aug-05	
General Services Administration	Federal Office Building No. 8	Washington	DC	LEED NC	2.1	550,000	19-Oct-05	
General Services Administration	Building Manager	Washington	DC	LEED EB	2	460,000	3-Jul-07	
General Services Administration	Lafayette Building Modernization	Washington	DC	LEED NC	2.1	320,202	28-Oct-05	
Smithsonian – National Museum of Natural History	NMNH HVAC Renov., SW Main Bldg, 3rd Flr	Washington	DC	LEED CI	2	14,500	23-Feb-07	
General Services Administration	GSA-WPD 1099 14th St- 4th floor	Washington	DC	LEED CI	2	6,500	9-Jan-07	
Dept of Defense – Army	Belvoir New Vision	Fort Belvoir	VA	LEED ND	1	11,000,000	28-Jun-07	
Dept of Defense – Army	Fort Belvoir Military Family Housing	Fort Belvoir	VA	LEED ND	1	4,269,000	30-May-07	
General Services Administration	New Richmond U.S. Courthouse	Richmond	VA	LEED NC	2.1	345,990	21-Jun-04	
Environmental Protection Agency with General Services Administration	One Potomac Yard	Arlington	VA	LEED EB	2	329,644	9-Aug-07	
Dept of Defense – Pentagon	Pentagon Library and Conference Center	Arlington	VA	LEED NC	2.1	115,000	17-Aug-04	

Appendix III: Federal Agency Benchmarks (continued)

- As of March 6, 2008, 82 federal buildings had been certified under the U.S. Green Building Council LEED rating system.
- As of March 12, 2008, 175 federal buildings had been labeled with ENERGY STAR.

Energy Star Benchmarks

Agency	Facility Name	Facility Type	Facility Owner	Property Manager	Location	Label Year(s)
Dept of Veterans Affairs	Hunter Holmes McGuire VA Medical Center	Hospital (Acute Care or Children's)	Department of Veterans Affairs	Hunter Holmes McGuire VA Medical Center	1201 Broadrock Blvd Richmond, VA 23249	2002, 2005
Dept of Commerce	USPTO Headquarters	Office	LCOR Incorporated	LCOR Incorporated	600 Dulany Street Alexandria, VA 22304	2007
General Services Administration	Walter E. Hoffman Courthouse	Courthouse	General Services Administration		600 Granby Street Norfolk, VA 23510	2007
General Services Administration	Richmond Federal Building	Office	General Services Administration	General Services Administration	400 N. 8th St Richmond, VA 23219	2007
General Services Administration	Norfolk Federal Building	Office	General Services Administration	General Services Administration	200 Granby Street Norfolk, VA 23510	2007
General Services Administration	600 E Street, NW	Office	6th & E Associates	S.C. Herman & Associates, Inc.	Washington, DC 20004	2004

Appendix IV: Utility Procurement Analysis

- FDIC is buying:
 - Electricity from a recently re-regulated market with no available option other than the GSA-negotiated rates it procures today.
 - Natural gas from a marketplace that allows customers to acquire their own gas supplies at competitive prices.
 - Water and sewer services from a municipal supplier regulated primarily by decisions of county government.
- Over a 15-month period from January 2007 to March 2008, the FDIC procured the following utility services:
 - Electricity \$2,130,084
 - Natural gas \$948,420
 - Water and sewer services \$234,579
- The existing electrical rates offer peak and off-peak prices, allowing the FDIC to buy off-peak electricity (timing varies between “winter” & “summer”) at a considerable savings:
 - On-peak direct costs \$0.073 / kWh
 - Off-peak direct costs \$0.024 / kWh
 - Weighted Average cost \$0.053 / kWh

Appendix IV: Utility Procurement Analysis (continued)

- Natural Gas
 - The FDIC procures natural gas for heating at lower rates as the FDIC agreed to curtail natural gas usage during peak demand and use heating oil instead. The flexibility to use either fuel results in cost savings to the FDIC.
 - In August 2007, the FDIC switched suppliers from an affiliate of Washington Gas to Pepco Energy Services. While seasonal differences in market prices may be partially responsible, the end result is a small reduction in price (\$1.32 to \$1.25 per therm).
- Alternatives to Existing Supply of Electricity--No economically feasible alternatives are currently available.
 - Lower standby generation and interruptible rates are available, but existing diesel generators are more costly to operate than on-peak electric rates.
 - Alternative technologies such as solar photovoltaic cells on the roof or flywheel storage technology in the basement are not currently cost effective.
- No utility-provided incentives are presently available, but Virginia is considering them.

Appendix V: Federal and Industry Guidance

Although not binding on the FDIC, Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, requires most Federal agencies to lead by example in advancing the nation's energy security and environmental performance by achieving these goals:

VEHICLES: Increase purchase of alternative fuel, hybrid, and plug-in hybrid electric vehicles when commercially available.

PETROLEUM CONSERVATION: Reduce petroleum consumption in fleet vehicles by 2% annually through 2015.

ALTERNATIVE FUEL USE: Increase alternative fuel consumption at least 10% annually.

ENERGY EFFICIENCY: Reduce energy intensity by 3% annually through 2015 or by 30% by 2015.

GREENHOUSE GASES: By reducing energy intensity by 3% annually or 30% by 2015, reduce greenhouse gas emissions.

RENEWABLE POWER: At least 50% of current renewable energy purchases must come from new renewable sources (in service after January 1, 1999).

BUILDING PERFORMANCE: Construct or renovate buildings in accordance with sustainability strategies, including resource conservation, reduction, and use; and indoor environmental quality.

Appendix V: Federal and Industry Guidance (continued)

Executive Order 13423 (continued)

WATER CONSERVATION: Reduce water consumption intensity by 2% annually through 2015.

PROCUREMENT: Expand purchases of environmentally-sound goods and services, including biobased products.

POLLUTION PREVENTION: Reduce use of chemicals and toxic materials and purchase lower risk chemicals and toxic materials from top priority list.

ELECTRONICS MANAGEMENT: Annually, 95% of electronic products purchased must meet Electronic Product Environmental Assessment Tool standards where applicable; enable ENERGY STAR features on 100% of computers and monitors; and reuse, donate, sell, or recycle 100% of electronic products using environmentally sound management practices.

ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS): Implement EMS at all appropriate organizational levels to ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities.

Executive Order 13423 consolidated and strengthened five executive orders and two memorandums of understanding and established new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability.

Source: Office of the Federal Environmental Executive (OFEE) - http://ofee.gov/eo/eo13423_main.asp

Appendix VI: Glossary

- **Distributed Resource Scheduler** – The continuous monitoring of energy utilization across resource pools and the intelligent allocation of available energy resources among the virtual machines based on pre-defined rules that reflect business needs and changing priorities. When virtual machine resources are constrained, additional capacity is made available by migrating live virtual machines to a different physical server using VMware's VMotion.
- **Energy Management Evaluation** – The review of a corporation's efforts to conserve energy in an effort to identify opportunities to further conserve energy and/or reduce utilities cost.
- **EO 13423** – Executive Order 13423 provides mandates for strengthening federal environmental, energy, and transportation management for Federal agencies, which are executive agencies as defined in section 105 of title 5, United States Code, excluding the Government Accountability Office.
- **EPEAT** - Green Electronics Council offers the Electronic Products Environmental Assessment Tool (EPEAT) to assist in the purchase of "green" computing systems. The Council evaluates computing equipment on 28 criteria that measure a product's efficiency and sustainability attributes. On January 24, 2007, President George W. Bush issued Executive Order 13423, which requires all United States Federal agencies to use EPEAT when purchasing computer systems.
- **GPF** – Gallons per flush—the unit of measure for water utilized within urinals and or toilets.

Appendix VI: Glossary (continued)

- **Green Roof** - A roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane, or a roof that utilizes some form of "green" technology, such as solar panels or a photovoltaic module, to reduce the "heat island" effect of buildings.
- **HVAC** – Acronym used for Heating, Ventilating, and Air Conditioning.
- **Key Performance Indicator (KPI)** – Financial and non-financial metrics used to help an organization define and measure progress toward organizational goals.
- **LEED** - The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed by the U.S. Green Building Council (USGBC), provides a suite of standards for environmentally sustainable construction. Since its inception in 1998, LEED has grown to encompass over 14,000 projects in 50 states and 30 countries covering 1.062 billion square feet (99 km²) of development area. The hallmark of LEED is that it is an open and transparent process where the technical criteria proposed by the LEED committees are publicly reviewed for approval by the more than 10,000 membership organizations that currently constitute the USGBC.

Appendix VI: Glossary (continued)

- **Renewables** - Renewable energy effectively uses natural resources such as sunlight, wind, rain, tides, and geothermal heat, which may be naturally replenished. Renewable energy technologies include solar power, wind power, hydroelectricity/micro hydro, and biomass and biofuels for transportation.
- **Sustainability** – Sustainable development marries two important themes: that environmental protection does not preclude economic development and that economic development must be ecologically viable now and in the long run. Common use of the term "sustainability" began with the 1987 publication of the World Commission on Environment and Development report, *Our Common Future*. Also known as the Brundtland Report, this document defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This concept of sustainability encompasses ideas, aspirations, and values that continue to inspire public and private organizations to become better stewards of the environment and that promote positive economic growth and social objectives. The principles of sustainability can stimulate technological innovation, advance competitiveness, and improve our quality of life.
- **WaterSense (EPA)** – WaterSense is a U.S. Environmental Protection Agency program designed to encourage water efficiency in the United States through the use of a special label on consumer products. It was launched in June 2006.

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Appendix VIII – Corporation Comments



Federal Deposit Insurance Corporation
3001 Fairfax Drive, Arlington, VA 22208-3000

September 9, 2008

MEMORANDUM TO: Stephen M. Beard
Assistant Inspector General for Evaluations and Management

FROM: Arleas Upton Kea
Director, Division of Administration

SUBJECT: Management Response to the OIG Draft Report Entitled, *Energy Efficiency of the FDIC's Virginia Square Facility and Information Technology Data Center (Assignment No. 2008-024)*

This is in response to the subject Draft Office of Inspector General (OIG) Audit Report, issued August 6, 2008. In its report, the OIG made five recommendations to the Division of Administration.

We appreciate the OIG noting that the FDIC took a number of actions to improve the energy efficiency of the Virginia Square facility and that the review team identified leading practices that FDIC implemented to reduce energy consumption and costs. This response outlines our planned corrective actions for each of the recommendations cited in the OIG's Report.

MANAGEMENT DECISION

Finding: The FDIC could benefit from a more programmatic approach to energy management and sustainability.

Recommendation 1: That the Director, Division of Administration (DOA) develop a formal Sustainability Program to include:

- Senior-level management commitment and sponsorship in support of energy management and sustainability initiatives. DOA, in consultation with DIT, should also consider establishing an interdivisional performance metric, such as a Corporate Performance Objective, related to sustainability.
- Sufficient personnel to manage the program and to integrate divisional energy management efforts.
- Energy, water, waste, and emission management plans linked to future "green" initiatives and short-, medium- and long-term actions.
- Policies and procedures for selecting green initiatives for consideration, procuring energy-efficient products, and for implementing the sustainability program.
- Program baselines, key performance indicators, and evaluation approaches for measuring progress.

Management Response 1: DOA concurs with the recommendation.

Corrective Action: In most instances, plans are being developed to achieve the recommendations made by KPMG LLC (KPMG) under a broader initiative to achieve certification under the U.S. Green Building Council's Leadership in Energy and Environmental Design¹ (LEED) green building certification program. As you may be aware, the LEED green building certification program for existing buildings [referred to as LEED EB] is an all-encompassing "sustainability program" whose goals include reducing energy and water consumption, waste reduction through increased recycling and "green" purchasing practices, and emissions management. These LEED goals and objectives are achieved through a combination of fine-tuning and enhancing existing building-related equipment and systems, equipment upgrades and capital improvements, and development and implementation of "sustainable" or "green" policies and procedures.

Currently, we are pursuing LEED EB certification at the Silver level with the assistance of our architectural and engineering contractor, Perkins & Will, and a LEED consulting firm, GreenShape, LLC. Corporate Services Branch (CSB) staff and LEED-trained professionals from these two firms are in the process of establishing energy and water consumption baselines and approach to reducing our utilization of these resources. Also, we are reviewing existing "sustainable" policies and procedures such as the current Recycling and Indoor Air Quality Directives in order to determine their adequacy under LEED EB and to identify areas of improvement in order to reduce FDIC's environmental footprint.

Pursuing LEED EB certification, and reducing our energy consumption and environmental footprint, are not only noble endeavors, they make good business sense. As the drivers of these initiatives, DOA is furthering its commitment to being good stewards of the Corporation's resources we manage. DOA will garner the support of senior managers at headquarters and throughout the Corporation in order to effectively implement these initiatives through e-mails, briefings and special events. In establishing our sustainability program, DOA's Corporate Services Branch (CSB), working with Perkins & Will and GreenShape, LLC, will develop an action plan by the end of this year that will address the OIG issues under this recommendation.

Completion Date: December 31, 2008

Recommendation 2: That the Director, Division of Administration (DOA) improve facilities infrastructure for monitoring energy management and sustainability efforts by:

- Installing or upgrading building energy management systems.
- Installing sub-metering capabilities to monitor specific uses of energy.

Management Response 2: DOA concurs in part with the recommendation.

Corrective Action: Installing an energy management system will require significant changes. During the course of KPMG's assessment of FDIC's resource conservation efforts at Virginia

¹ LEED certification provides independent, third-party verification that a building project meets the highest green building and performance measures. All certified projects receive a LEED plaque, which is the nationally recognized symbol demonstrating that a building is environmentally responsible, profitable and a healthy place to live and work.

Appendix VIII – Corporation Comments (continued)

Square, KPMG was informed of the two energy management systems (also commonly referred to as building automated control systems) that service Virginia Square, Trane Summit and Johnson Controls at Virginia Square Phase I and II respectively. These two energy management systems effectively control the temperature and ventilation within the Virginia Square campus.

However, these systems have several limitations, i.e. neither can control lighting or increase ventilation due to increased carbon dioxide concentrations, that will require either significant upgrades (in the case of Johnson Controls) or replacement (in the case of Trane Summit) in order to fully perform consistent with LEED certification for existing buildings. It is anticipated that options to upgrade or replace these systems will be fully explored during the LEED analysis and certification process. Based on this analysis, DOA's CSB will develop an action plan by the end of this year.

Completion Date: December 31, 2008

Adopting sub-metering, i.e. electricity, gas and water, will play a critical role in FDIC obtaining LEED Certification for two main reasons. First, installing various sub-meters is necessary for an accurate assessment of the Virginia Square campus' energy utilization. The energy utilization for each of the buildings that comprise the Virginia Square campus will enable us to complete the requisite Energy Star assessment, a pre-requisite for LEED certification. Second, sub-metering will allow us to gather sufficient utility utilization data to determine those upgrades and capital improvements that will substantially reduce Virginia Square's energy consumption and earn points towards LEED certification. A plan to implement sub-meters for natural gas, electricity, and water (chilled and hot) is currently being developed. It is anticipated that the necessary sub-meters will be installed by the end of the second quarter, 2009.

Completion Date: June 30, 2009

Recommendation 3: That the Director, Division of Administration (DOA) develop a communication strategy and campaign to increase employee awareness and acceptance of energy savings initiatives and efforts.

Management Response 3: DOA concurs with the recommendation.

Corrective Action: We agree that developing and implementing an effective communications program that is specifically geared to engage employees and solicit their input for the various "sustainability" initiatives is necessary to ensure the ultimate success of our efforts. In this regard, we contemplate utilizing a wide range of communication tools, including the intranet, e-mail messages, the FDIC News, and the existing Customer Advisory Meetings as means to convey our "sustainable" and "green" initiatives, and solicit employee input. This issue will be fully explored and made a part of the CSB action plan to be developed by the end of the year.

Completion Date: December 31, 2008

Recommendation 4: That the Director, Division of Administration (DOA) assemble a team or assign resources to further study potential energy management improvements discussed on slides 11 and 12 of this report.

Management Response 4: DOA concurs with the recommendation.

Corrective Actions: As discussed under our response to Recommendation 1 above, DOA's Corporate Services Branch is pursuing LEED EB certification with the assistance of our architectural and engineering contractor as well as a LEED consulting firm. As part of this process, DOA's CSB will look at fine-tuning and enhancing existing equipment and systems and develop an action plan accordingly by the end of the year. Slides 11 and 12 of the OIG's Draft Report will be considered as part of this process.

Completion Date: December 31, 2008

Recommendation 5: That the Director, Division of Administration (DOA) evaluate energy management initiatives discussed in this report for applicability and consideration at other FDIC-owned and leased facilities.

Management Response 5: DOA concurs with the recommendation.

Corrective Action: DOA's Corporate Services Branch is pursuing LEED EB certification with the assistance of our architectural and engineering contractor as well as a LEED consulting firm. An action plan will be developed by the end of the year to address any changes/improvements to FDIC facilities as appropriate.

Completion Date: December 31, 2008

If you have any questions regarding this response, the point of contact for DOA is William Gately at (703) 562-2118.

cc: Glen Bjorklund, DOA
Michael J. Rubino, DOA
Brian Yellin, DOA
James H. Angel, Jr., OERM
William J. Gately, Jr., DOA

Appendix IX – Management Response to Recommendations

This table presents the management response on the recommendations in our report and the status of the recommendations as of the date of report issuance.

Rec. Number	Corrective Action: Taken or Planned/Status	Expected Completion Date	Monetary Benefits	Resolved: ^a Yes or No	Open or Closed ^b
1	DOA concurred with the recommendation and is working on developing plans to address the recommendations made by KPMG LLP (KPMG) under a broader initiative to achieve certification under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) green building program. Currently, DOA is pursuing LEED certification at the Silver Level with the assistance of two contractors. DOA will garner support of senior managers at headquarters and throughout the Corporation in order to effectively implement these initiatives.	December 31, 2008	\$0	Yes	Open
2	DOA stated that it plans to fully explore upgrading or replacing building energy management systems during the LEED analysis and certification process. DOA concurred in part with this recommendation, stating that adopting sub-metering will play a critical role in FDIC obtaining LEED certification.	December 31, 2008 (energy management systems) June 30, 2009 (sub-metering capabilities).	\$0	Yes	Open

Appendix IX – Management Response to Recommendations (continued)

Rec. Number	Corrective Action: Taken or Planned	Expected Completion Date	Monetary Benefits	Resolved: ^a Yes or No	Open or Closed ^b
3	DOA concurred with the recommendation and is contemplating utilizing a wide range of communication tools, including the internet, e-mail messages, the FDIC News, and the existing Customer Advisory Meetings as means to convey the green and “sustainable” initiatives, and solicit input.	December 31, 2008	\$0	Yes	Open
4	DOA is pursuing LEED certification and, as part of this process, will look at fine tuning and enhancing existing equipment and systems and develop an action plan accordingly. Slides 11 and 12 of the OIG’s report will be considered as part of this process.	December 31, 2008	\$0	Yes	Open
5	DOA concurred with the recommendation and stated that an action plan will be developed by the end of the year to address any changes/improvements to FDIC facilities as appropriate.	December 31, 2008	\$0	Yes	Open

^a Resolved: (1) Management concurs with the recommendation, and the planned corrective action is consistent with the recommendation.
(2) Management does not concur with the recommendation, but planned alternative action is acceptable to the OIG.
(3) Management agrees to the OIG monetary benefits, or a different amount, or no (\$0) amount. Monetary benefits are considered resolved as long as management provides an amount.

^b Once the OIG determines that the agreed-upon corrective actions have been completed and are responsive to the recommendations, the recommendations can be closed.