



Department of Technology Departmental Climate Action Plan

Department of Technology Departmental Climate Action Plan Fiscal Year 2011

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1. Introduction

The Department of Technology (DT) plans a number of initiatives in the coming year to reduce greenhouse gas emissions. These measures include:

- Reduce in the number of servers through server virtualization.
- Lead the effort to create a more energy efficient, consolidated City data center at the San Francisco Airport.
- Examine feasibility of replacing diesel back-up power with renewable and cleaner alternatives for mission critical radio sites.
- Initiate wind power generation at our Twin Peaks radio facility.
- Update standards for purchasing and operating information technology (IT) equipment, including personal computers, laptops and servers.
- Replacing our existing fleet of cargo vans with more fuel efficient vehicles.



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2. Departmental Profile

The DT’s vision is to provide a unified technology infrastructure and environment that facilitates communication and data sharing with decentralized access and control of reporting and reinvests savings in technology innovation and efficiencies. This vision is supported by the Department’s mission of providing high-quality, cost-effective, customer-focused information technology and telecommunications solutions.

This vision and mission were developed to address significant concerns identified by our customers including the need for technology leadership, improved technology and systems, customer service, and financial accountability. The Five-Year Technology Realignment Plan, and the Department’s previous strategic planning efforts, used the Balanced Scorecard approach to focus on five principal areas: governance, learning and growth, internal processes, customers, and financial stewardship.

DT’s budget for fiscal year 2011/2012 is \$74,183,448. DT has 196 full time equivalent (FTE) employees budget for fiscal year 2011/2012. DT has 55 vehicles in its fleet.

DT operates the following facilities:

Name	Address	Description
Headquarters	1 So. Van Ness Ave.	Administrative offices and remote “Command Center” for data center.
Corporation Yard	900 Rankin St.	Management and field staff for inside wiring, outside plant and radio services.
SFGTV	City Hall	Government cable channel operation
Data Center (New)	200 Paul Ave.	Migration to be complete, Spring 2011.
Central Radio Station	Twin Peaks	Operate public safety and other radio systems.

In addition to these facilities, DT from time to time installs and operates systems for client City departments. Examples include the Outdoor Public Warning system, the Community Camera network and the “Shot Spotter” pilot.

DT’s climate liaison Brian Roberts, Senior Policy Analyst, brian.roberts@sfgov.org, 415-581-4061, prepared this plan.



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3. Departmental Carbon Footprint and Historical Analysis

In FY 2010/2011 DT produced approximately 409 metric tons (mt) carbon dioxide equivalent (CO₂e). This represents a 2% decrease compared to FY 2010/2011's estimate of 364 metric tons CO₂e.

a. Facilities Reduction Measures

The list of facilities that the San Francisco Department of the Environment is using to calculate the FY2010/2011 carbon footprint has been verified by DT's Climate Liaison and is accurate and complete. One of the facilities, the One Market Plaza Data Center was closed during the course of FY 2010/2011, so should be removed from the list going forward.

DT consumed electricity, natural gas and steam during FY 2010/2011. Electricity consumption consisted of both San Francisco Public Utility and Pacific Gas and Electric produced energy. DT consumed 3,530,068 kWh of electricity resulting in 42.5 metric tons of CO₂e. This is the first year in which DT has had significant use of PG&E electricity due to the opening of a data center in a privately owned collocation site.

DT consumed 18,780 therms of natural gas resulting in 99.90 metric tons of CO₂e. This represents a 27% increase in natural gas consumption. DT's Real Estate Division (RED) division managed headquarters at 1 So. Van Ness Avenue experienced a 41% increase, while the DT managed facility at 901 Rankin St. experienced only a 23% increase. DT believes that colder outdoor temperatures were responsible for these increases.

With a minor presence in City Hall, DT consumed 317,233 pounds of steam resulting in 30.03 mt CO₂e.

DT does not have any energy efficiency retrofit projects. The largest facility that DT owns, the Corporation Yard at 901 Rankin St, is planned to be abandoned by DT within the next three years and subsequently demolished. Therefore, energy efficiency retrofits have not been considered for the facility.

In order to comply with the Existing Commercial Building Energy Performance Ordinance (Ord 17-11, SF Environmental Code Chapter 20), DT used SFPUC's Energy Performance Benchmarking web tool to provide the SFPUC with the following information:

- Verification of the department's list of facilities.
- Verification of existing data for each facility (such as street address, year built, gross square footage, and primary EPA building category).
- ENERGY STAR benchmarking data specific to the primary EPA building category (such as weekly operating hours, number of workers on main shift, and if applicable, additional information on the facility, subspaces, and parking areas).

DT's Corporation Yard is subject to the Commercial Lighting Efficiency Ordinance, Building Inspection Code Chapter 13D. However, since the building is set to be demolished within the next three years, DT has sought a waiver by the San Francisco Department of the Environment. A waiver has been submitted to the Department of the Environment.



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b. Renewable Generation

Twin Peaks Wind Turbine. DT originally proposed wind power at its Twin Peaks Radio Facility in July 2008 and has been working with the PUC's Renewable Generation group to achieve this goal. According to research by the California Energy Commission, Twin Peaks has the City's best wind resource, so that the City could maximize its return on investment in wind power by installing a wind turbine at this location. In addition, the facility itself has high power demand consuming 701,040 kWh of electricity in FY 2010/2011. The facility is the central broadcasting point for the City's public safety radio system which requires robust back-up power. DT has sought to use the wind turbine to supplement its battery and generator based back-up power arrangement.

The current plan is to install a 10 kW horizontal access wind turbine at the Radio Facility. DT would like to ensure that this valuable wind resource is utilized to its fullest potential and that the most productive possible turbine is placed in this area, consistent with the primary use of the site. In addition, DT is working with the PUC to ensure that this turbine continues to operate during a power outage to reduce DT's reliance on back-up diesel generators at this critical public safety facility. The PUC has secured funding for a 10 kW turbine and is working on a final design for the project.

DT is also seeking alternative technologies for back-up power at its radio facilities. The purpose of this effort is to provide more robust and environmentally sensitive technologies to replace the current diesel generator arrangement. One of the radio sites is the Twin Peaks facility, where DT is seeking to integrate the back-up power solution with the wind generation solution. DT expects to commence the project in April 2012 and complete the initial alternatives analysis by the end of June.

c. Water Consumption

The SFPUC asserts that DT consumed 713,592 gallons in FY 10/11. This represents a 41% increase in water consumption. Water consumption declined at DT's 901 Rankin St. Corporation Yard, 1 So. Van Ness Ave. Headquarters and other facilities, but more than doubled at its Twin Peaks radio facility. The reason for this spike in usage is most likely a leak (aka a "continuous use event"). The leak appears to have been resolved, but DT will work with the SFPUC to reduce the risk of a recurring event.

d. Fleet & Fuel Reduction Measures

The list of vehicles and liquid fuel consumption values that are being used by SF Environment to calculate the FY1011 departmental carbon footprint has been verified by Department of ABC's Climate Liaison and Fleet Manager to be accurate and complete.

DT used 22,544 gallons of gasoline resulting in 198 mt CO₂e, 2078 gallon equivalents of compressed natural gas resulting in 13 mt CO₂e, 2255 gallons of B5 diesel resulting in 22 mt CO₂e and 436 gallons of B20 diesel resulting in 3 mt CO₂e. Consumption of all fuels is down in FY 2010/11.

DT submitted a plan to SF Environment in order to comply with the requirements set of the Healthy Air and Clean Transportation Ordinance ("HACTO" Chapter 4 of the City's Environmental Code). This plan is attached as "Appendix: HACTO".



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The DT HACTO Plan for FY 2010-2011 outlines DT's plans for:

- the total number of non-alternative and alternative fuel vehicles to be purchased in Fiscal Year 2012-2013
- the total number of vehicles to be removed from service this Fiscal Year 2011-2012
- how the department intends to use walking, biking, MUNI, BART, car share, or other driving-alternative programs to reduce vehicle usage

e. Historical Analysis

DT's primary sources of CO₂E are gasoline (48%) and natural gas (24%).

Gasoline consumption and associated CO₂E has declined 2% per year over the three year period. One strategy for reducing CO₂E is to replace DT's aging fleet of cargo vans, most subject to HACTO, with more efficient. For example, replacing a 2000 Chevrolet Astrovan (15 mpg) with a 2012 Ford Transit van (21 mpg) driven 5000 miles per year would result in 1 mt reduction in CO₂e per van. (Based on US Dept. of Energy <http://www.fueleconomy.gov/feg/Find.do?action=sbs&id=16176&id=31458&#tab2>.) If all 14 , HACTO eligible DT cargo vans were replaced with the more fuel efficient, this would result in a 7% reduction in DT's attributable to gasoline.

Natural gas consumption declined between FY 08/09 and 09/10 and increased between FY 10/11. The pattern suggests that this was driven more by weather patterns. There were no significant changes in use or heating efficiency programs in either facility that would explain the change. The increase in FY 10/11 over the prior year was most dramatic (41%) in the RED managed 1 So. Van Ness Avenue headquarters facility, than the DT managed corporation yard (23%). DT will move from its Corporation Yard in the coming years and , the expected move and demolition of the Corporation Yard has discouraged investment in energy efficiency features at the facility.

DT's electricity consumption was flat over the three year period. This masks underlying changes in electricity usage during the period. In FY 2010-2011 DT moved the City's primary data center from One Market Plaza to 200 Paul Ave. During this transition, both data centers were operating. Once moved into the new data center DT engaged in a major server virtualization project. Server virtualization allows applications to share computing resources over multiple servers. This allows a reduction in the number of physical servers. While servers operating in a virtualized environment tend to be more heavily utilized and use more energy and require greater cooling, overall there is a reduction in energy use. The virtualization initiative begun after the move to 200 Paul Ave replaced 161 servers with 24 virtualized servers, PG&E estimated that this project would result in a total of 283,352 kWh savings, 175,419 kWh direct savings and reduce indirect energy use by 107,933 kWh for such things as cooling. DT continues to seek new opportunities to virtualize servers. During the transition to a virtualized environment, both the old and operating, real savings should be achieved outside of this initial period.

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4. Other Sustainable Practices

a. Zero Waste

The results of DT’s Waste Assessment Questionnaire are attached to the report as “Appendix: Waste Assessment Questionnaire.” The table below lists the actions that our Zero Waste Coordinators have committed to at each of our locations that will help staff at each location properly recycle, compost, and/or reduce waste.

Facility Name	Address	Commitment
Headquarters	1 So. Van Ness Ave., 2 nd Fl.	Educate on compost/recycle/landfill distinction
Corporation Yard	901 Rankin St.	Review material packaging recycling procedure
SFGTV	City Hall	Educate on compost/recycle/landfill distinction

b. Transportation Options

In 2011, DT took a number of steps to promote transportation options:

- Promoted transportation options by participating for the first time in the “Great Race for Clean Air” in September 2011. DT promoted this program through e-mails to all employees and posters placed in high traffic areas of its facilities in August of 2011.
- Distributed information on the Clipper Card transition for commuter benefits in May 2011.
- DT posted information on commuting alternatives and commuter benefits in lunch rooms.

Actual employee participation in the Great Race was disappointing. Many employees were discouraged by the enrollment process which made it difficult to identify the department and change user information. The only were coached individually. DT will seek to train employees more actively in the future.

DT did not schedule a presentation by the Dept. of the Environment’s Commute Smart group in 2011, due to a recent presentation in 2010 and a lack of all staff meetings. DT plans to schedule a presentation this year.

In 2012, DT plans to:

- Participate in the Great Race for Clean Air with more vigorous outreach and assistance with enrollment.
- DT requested and received a commitment to equip a three bike pool in February 2012 and will proceed with the next steps to establish the pool when contacted by the Dept. of the Environment.
- Promote telecommuting options by meeting with directors of DT’s four internal divisions to establish a strategy appropriate to each group and subsequently discuss at division meetings.
- Invite the Dept. of the Environment’s Commute Smart Division to present/table at our next all staff meeting (yet to be scheduled.)

c. Green Purchasing

The results of DT’s Buy Green Scorecard are attached as Appendix “Buy Green Scorecard”



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d. Information Technology

DT is engaged in a variety of initiatives intended to increase the energy efficiency of the City's IT operations while making them more reliable and robust.

Through the CIO (Chief Information Officer) Review process, the City's CIO actively monitors compliance with the City's "Environmentally Preferable Purchasing Requirements for Personal Computers and Servers" for all City departments' IT purchases. DT will work with the Committee on Information Technology (COIT) to update these policies originally approved in 2008.

All DT personal computers have power management features enabled so that they go into a standby mode when not in use. Prior to being put in use, DT's personal computer management team sets computers so that monitors and central processing units are put in standby mode after 20 minutes. These settings are subsequently locked, so that only a designated administrator may change them.

DT is actively engaged in two citywide initiatives designed primarily to improve the reliability of information technology, but that will also lead to greater energy efficiency: (1) the creation of a citywide data center and (2) a citywide server virtualization.

DT is working with the Airport on the construction of a new data center at the Airport. The new facility is being designed to have a power utilization efficiency (PUE) rating of less than 1.8. (The PUE is a data center industry metric that measures the ratio of power used for computing to the total power used by the data center. Other uses of power include cooling, lighting and other mechanical systems. The lower the PUE, the more energy efficient the data center.) Specifically, the data center will incorporate:

- Energy efficient cooling system;
- The use of outside air economizers;
- Highly efficient uninterrupted power supply (UPS) system;
- Hot air containment system to evacuate the hot air and lower the amount of cold air required for the equipment;
- Panels to ensure to ensure that all the cold air is used to cool the equipment and does not bleed into the hot air;
- The electrical and UPS equipment is being installed in a manner to limit cooling of the mechanical systems;
- The size of the building itself has been reduced to the extent possible to lower any non-data center cooling requirements.

The data center is expected to be complete in November 2012 and ready to receive servers ninety days later.

DT is in the process of evaluating over 1800 servers citywide to determine whether they can be virtualized and then to proceed with the actual virtualization. To date, DT has reviewed 1190 servers and anticipates eliminating 521 physical servers. As discussed in Section 3.e, in the initial phase of the project, DT virtualized 161 servers resulting in a savings of 283,000 kWh per year. We expect that citywide virtualization will yield similar energy efficiency improvements.



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5. Communitywide Impact

DT is primarily an internal services department; however, there are two ways in which DT can have an impact in reducing community wide CO₂e by supporting technologies that allow residents to access city services remotely or on-line rather than in person.

DT currently supports technologies that allow residents to access services remotely or on-line. An example of this is an urban telemedicine project DT is conducting with the Department of Public Health and University of California San Francisco. Under this project, the DT is providing deliver fiber to DPH operated community health clinics. Patients visiting the clinics would potentially have access to specialists at San Francisco General Hospital and UCSF as well as a pool of medical translators. The primary purpose of this project is to improve patient care; however, it has the associated benefit of reducing travel and associated CO₂e emissions. An initial demonstration site has already been established at the Maxine Hall clinic in the Western Addition, where UCSF clinicians and medical interpreters are offering medical services remotely to patients in the clinic. A plan to expand this to all eleven community and jail based clinics is currently underway.